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TABLE OF CONTENTS

Management of Tuberculous Laryngitis. Frank R. Spencer, Boulder, Colo. 335

Treatment of Laryngeal Tuberculosis. H. H. Briggs, Asheville, N. C. 338

Obstructive Tuberculosis of the Larynx. Joseph B. Greene, Asheville, N. C. 341

Prognostic Value of Laryngeal Tuberculosis. Claude L. LaRue, Shreveport, La. 344

Symposium on Laryngeal Tuberculosis, papers of Dr. Spencer, Dr. Briggs, Dr. Greene and Dr. LaRue, discussed by Charles L. Minor, Asheville, N. C.; S. J. Chapman, Colorado Springs, Colo.; Wm. J. Greenfield, Memphis, Tenn.; Edward A. Looper, Baltimore, Md.; William L. Dunn, Asheville, N. C.; Louis Daily, Houston, Tex.

Infantile Diarrhea. Wilburt C. Davison, Durham, N. C. 349

Surgical Treatment of Chronic Mastitis. Guy Aud, Louisville, Ky. 352

Discussed by Irvin Abell, Louisville, Ky.; Robert L. Sanders, Memphis, Tenn.

Use of Ammonium Chlorid and Novasurol in the Treatment of Edema. W. C. Blake, Tampa, Fla. 357

Discussed by Thomas P. Sprunt, Baltimore, Md.; Henry M. Thomas, Jr., Baltimore, Md.; E. C. Thrash, Atlanta, Ga.

Differentiation of the Various Types of Goiter. J. A. Crisler, Memphis, Tenn. 361

The Plight of the Dependent Child. Robert A. Strong, Pass Christian, Miss. 363

The Relation of the Acne Bacillus to Acne Vulgaris: Experimental Observations. Lloyd W. Ketron, Baltimore, Md. 368

Discussed by J. C. Michael, Houston, Tex.

Relation of Allergic Reagin to True Atopen in Pollen. J. H. Black, Dallas, Tex. 373

Discussed by I. S. Kahn, San Antonio, Tex.

Evils of Too Much Milk. Eugene Rosamond, Memphis, Tenn. 376

(Continued on next page)

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TABLE OF CONTENTS—Concluded

Importance of Proper Ano-Rectal Examination. F. M. Durham, Columbia, S. C. 378

A Proctologic View of Constipation. Cecil D. Gaston, Birmingham, Ala. 380

Papers of Dr. Durham and Dr. Gaston discussed by John L. Jelks, Memphis, Tenn.; Thomas Brockman, Greer, S. C.; N. H. Palmer, New Orleans, La.

The Conduct of Labor. Howard F. Kane, Washington, D. C. 384

Obstetrical Emergencies in the Home. Edward Speidel, Louisville, Ky. 388

Papers of Dr. Kane and Dr. Speidel discussed by J. S. Ayres, Memphis, Tenn.; Jerre Watson, Anniston, Ala.; E. Lee Dorsett, St. Louis, Mo.; E. J. Brown, Stanford, Ky.; Basil M. Taylor, Portland, Ind.

The Healing Process in Fractures. Robert W. Johnson, Jr., Baltimore, Md. 394

Discussed by Isidore Cohn, New Orleans, La.; H. Earle Conwell, Fairfield, Ala.

Rabies an Unnecessary Disease. C. A. Shore, Raleigh, N. C. 397

Discussed by Oscar Dowling, New Orleans, La.; D. J. Williams, Gulfport, Miss.; S. S. Cook, Quantico, Va.; W. C. Hatchett, Huntsville, Ala.; H. S. Mustard, Murfreesboro, Tenn.; R. K. Flannagan, Richmond, Va.; A. T. McCormack, Louisville, Ky.; S. W. Welch, Montgomery, Ala.; J. A. Hayne, Columbia, S. C.; T. C. Terrel, Fort Worth, Tex.

Transportation of Fractures in Railway Service. Archibald Eastwood Chace, Texarkana, Ark. 401

Discussed by Jos. M. Burke, Norfolk, Va.; R. A. Woolsey, St. Louis, Mo.

Infectious-Toxic Psychoses: Study of Thirty-Six Cases. James N. Brawner, Atlanta, Ga. 406

Discussed by W. W. Young, Atlanta, Ga.

Proper Dosage of Morphin Sulphate for Oral and Hypodermic Use. Leon L. Solomon, Louisville, Ky. 408

Pseudo-Tumor of the Brain. A. G. Jacobs, Memphis, Tenn. 410

The Organization and Accomplishments of the Memphis Physicians' Business Bureau, Incorporated. H. B. Everett, Memphis, Tenn. 410

EDITORIALS 412

ASHEVILLE—WHERE WE MEET 414

BOOK REVIEWS 416

BOOKS RECEIVED 418

SOUTHERN MEDICAL NEWS 418

OFFICERS, SOUTHERN MEDICAL ASSOCIATION 420

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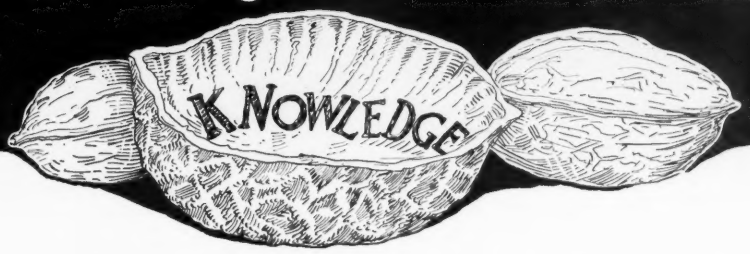

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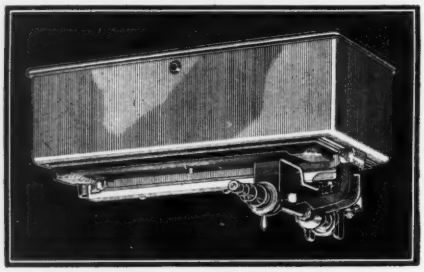

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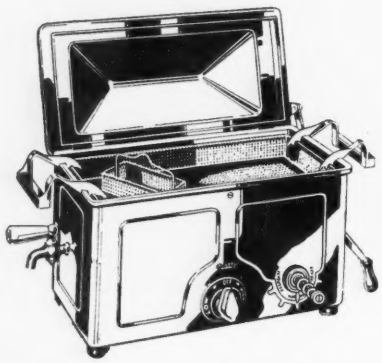

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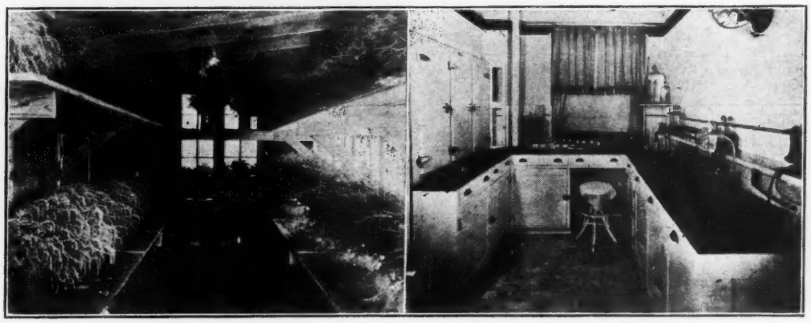

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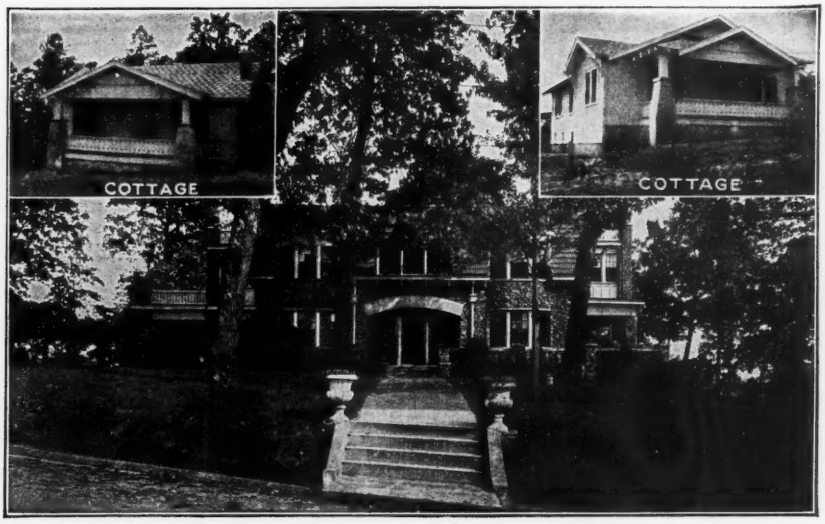

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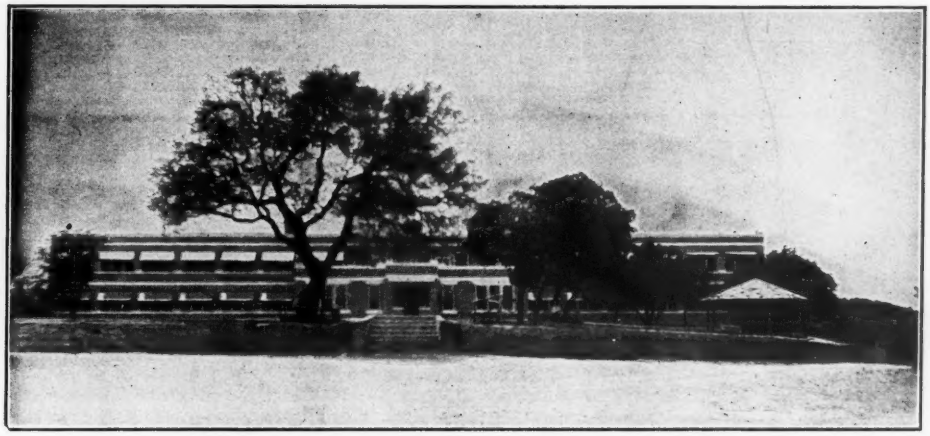

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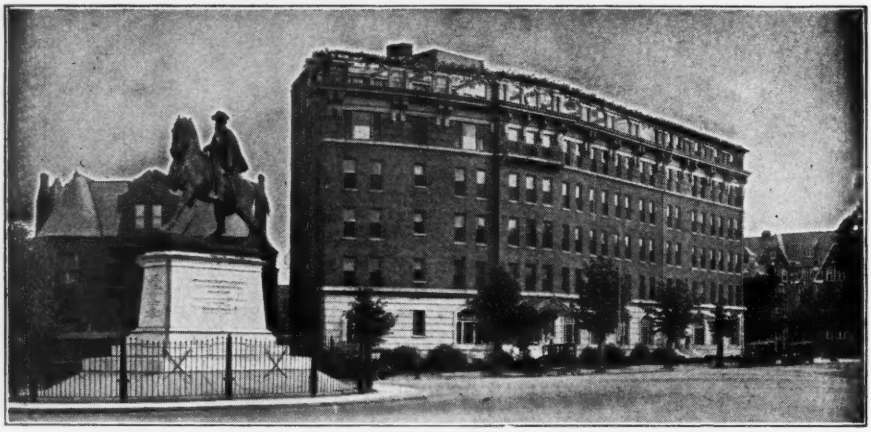

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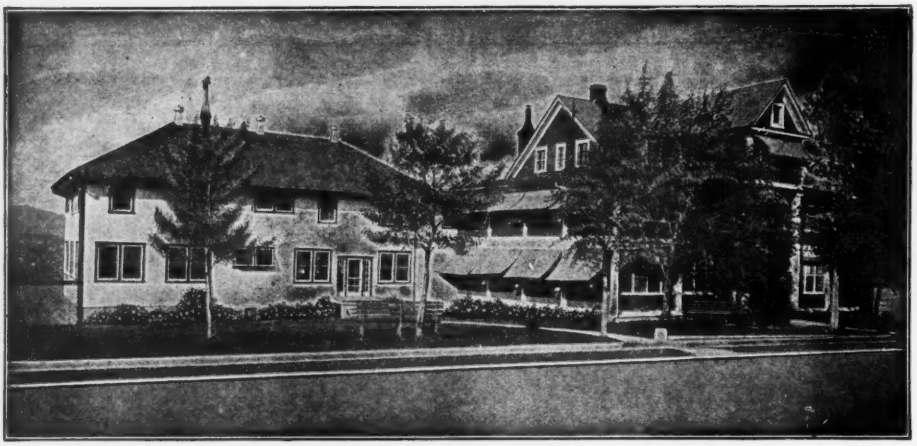

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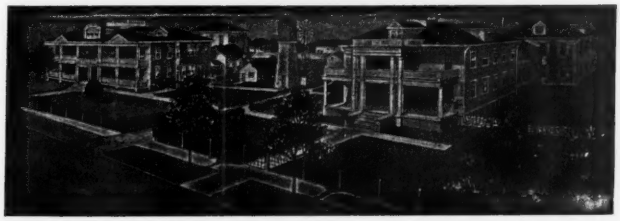

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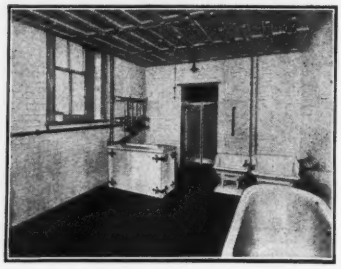

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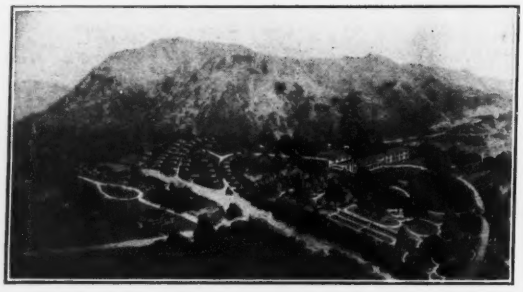

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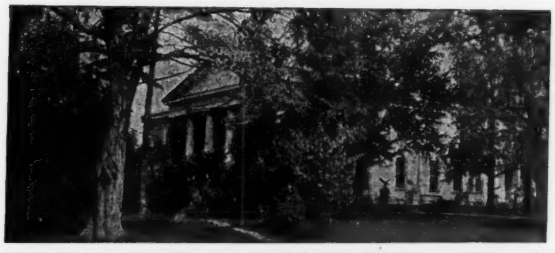

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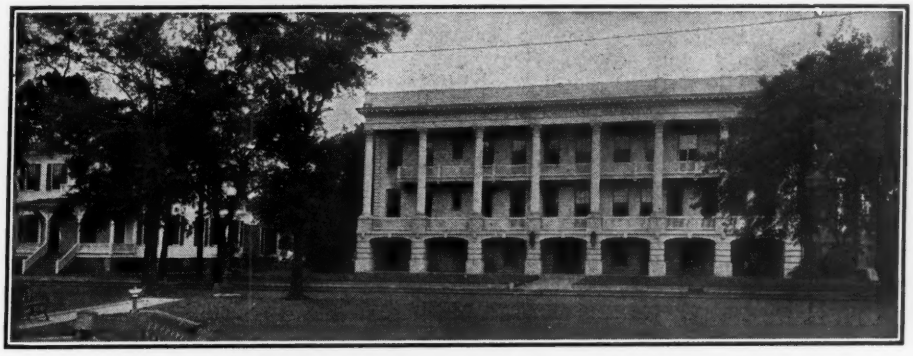

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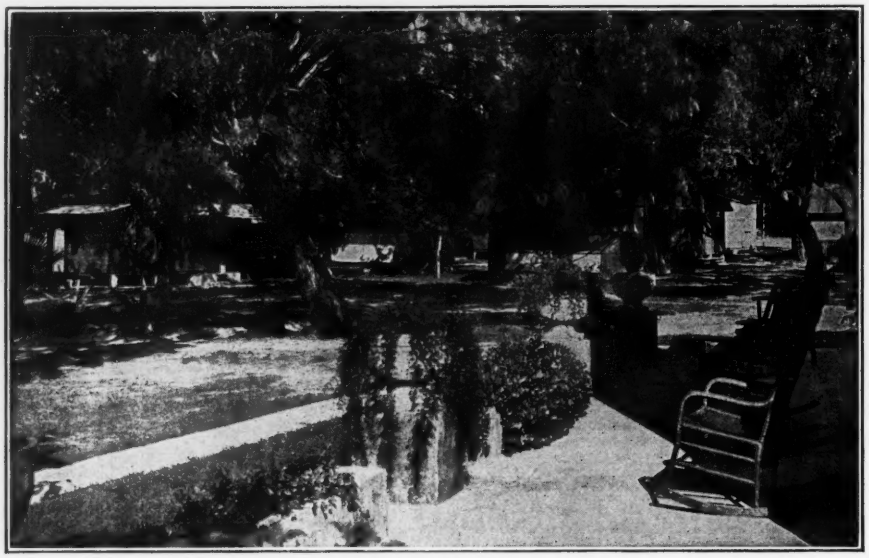

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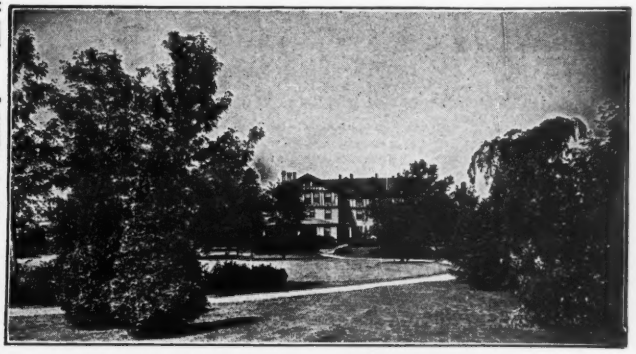

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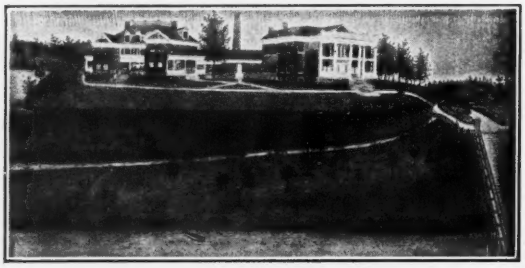

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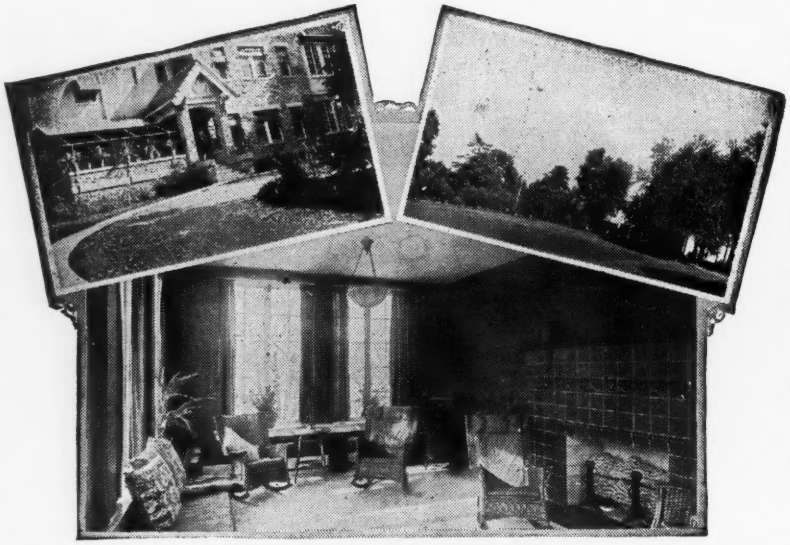

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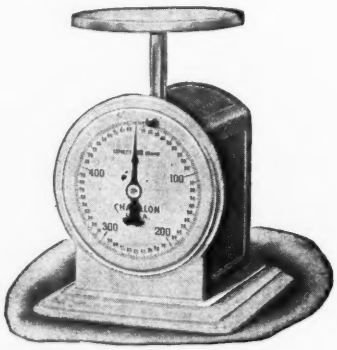

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MANAGEMENT OF TUBERCULOUS LARYNGITIS*

By FRANK R. SPENCER, A.B., M.D., F.A.C.S., Boulder, Colo.

Tuberculosis of any organ of the body is rarely a disease of days or weeks. The care of a tuberculous patient requires weeks, months or even several years before death claims the patient, or an arrest, and possibly a subsequent cure are accomplished. Naturally the time at which the laryngologist is consulted has much, but by no means all, to do with the final outcome. For convenience laryngeal tuberculosis may be classified as follows:

(1) Early or incipient cases, other things being equal, are the most favorable for an early arrest of the disease and an ultimate cure.

(2) Moderately advanced cases are less favorable and require more time before much can be accomplished. The final result depends largely upon the improvement of the lungs.

(3) Advanced or late laryngeal tuberculosis is always very serious and is usually rapidly fatal.

The laryngeal form of tuberculosis is often a late complication of pulmonary tuberculosis, because the larynx rarely becomes infected until the patient has had pulmonary tuberculosis for many months or even a few years. Apparently, the laryngeal disease is early, in some patients, because the pulmonary disease has been latent or incipient. This has led some laryngologists to make a diagnosis of primary laryngeal tuberculosis. Laryngologists of such wide experience with laryngeal tuberculosis as Sir St. Clair Thomson[1], Robert Levy[2], Hubert Arrowsmith[3] and Hill Hastings[4] frankly admit they have not seen such a case.

All types of laryngeal tuberculosis are as a rule chronic. The acute or subacute types are usually acute exacerbations of the chronic disease. Military tuberculosis is, of course, an acute type of general tuberculosis, the larynx becoming involved just as all the other organs of the body do.

Prevention of all forms of tuberculosis should receive careful consideration from the medical profession, if we expect materially to reduce the high death rate from this disease. Public health journals are doing much good in this direction. *Hygeia* is reaching many homes, but it should be in every home.

The prevention of pulmonary tuberculosis can best be carried out by systematic and pleasant exercise in the fresh air and especially in the sunshine. Fresh air should be provided in every public and private building and particularly in the sleeping room. Good wholesome food for children and adults builds up resistance to disease. Proper hours for rest and recreation are very essential. Cathell[5] says, "rec-reation is recreation". Avoid exposure to patients with a cough. Patients should be requested to cover the mouth with a handkerchief whenever they cough or sneeze. A sputum cup must be used for all sputum.

Prevention of the laryngeal form of the disease, so far as our present knowledge will permit, can be accomplished only by an early diagnosis of the pulmonary tuberculosis and with proper treatment. It has been variously estimated that from 45 to 90 per cent of all patients with advanced pulmonary tuberculosis develop larygeal tuberculosis as a complication, for from one month to many months before death.

Subjective Symptoms—Early in the disease patients may complain of tickling in the throat, dryness, slight huskiness, hoarseness, and, at times even aphonia. Talking produces more fatigue than formerly. At first these symptoms may be present for only a few hours daily, but later they are more annoying. Constant aphonia, dysphagia, or odynphagia, are late and usually

*Read in Section on Eye, Ear Nose and Throat, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

serious symptoms. To wait for late symptoms is to invite disaster.

Objective Symptoms.—Slight anemia with some mottling, or even hyperemia, if the patient is coughing a great deal, may be all that the laryngologist finds in the larynx. Infiltration of the posterior laryngeal wall, with obliteration of the interarytenoid sulcus, is also an early symptom. This same infiltration may involve the cushion of the epiglottis. Extension to the base of the tongue or the arytenoids is less favorable.

Ulcers are usually late lesions whether superficial or deep, acute or chronic. The superficial ulcers are likely to spread to the surface and to extend deep into the larynx even in the chronic cases. Small ulcers coalesce to form larger ones. Deep ulcers may also be produced by the rupture of tubercles. Ulcers are not always easy to see and yet they may cause a great deal of discomfort or even pain. If the larynx is sprayed with any mild alkaline antiseptic, such as liquor antisepticus alkalinus to remove secretions, the ulcers may be recognizable. Small superficial ulcers may require staining with a 2 per cent aqueous solution of fluorescein sprayed into the larynx. The ulcers take a light green stain and can usually be seen.

Patients who complain of pain for the first time, in the absence of other demonstrable causes, often have small ulcers. Their complaints should not be ignored. Most tuberculous patients are optimistic and they often have the patience of Jobe. Everything should be done to give them relief, if possible.

Tuberculomata or tuberculous granulomata, edema and fibrosis are more advanced lesions, the result of the insidious advance of the laryngeal disease. Perichondritis, chondritis and necrosis are very late and usually fatal lesions. If limited to the upper free edge of the epiglottis they are more amenable to treatment. Fibrosis represents nature's effort to cure the larynx. This effort should be encouraged.

Diagnosis.—The diagnosis of laryngeal tuberculosis from the laryngeal picture alone is not always possible, neither is it necessary nor always desirable. A thorough examination should always be made of the nose and throat, using first the indirect laryngeal mirror. This examination may be supplemented, either at the time of the first examination or subsequently, by direct examination with a Jackson's or Mosher's direct laryngoscope, with Haslinger's directoscope or Lynch's suspension laryngoscope. Transillumination of the frontal and maxillary sinuses, followed by taking roentgenograms of the sinuses, helps to find non-tuberculous infections of the upper respiratory tract, which, with our present knowledge, we know to be often more important than the tuberculous disease. It is not uncommon to find that the tuberculous disease is of secondary importance as compared with the non-tuberculous infection. Bronchiectasis has often been, and I am sorry to say, continues to be, mistaken for pulmonary tuberculosis. Less extensive infections of the lower respiratory tract caused by disease of the nasal accessory sinuses may give rise to an error in diagnosis. In fairness to the patient it is not best to be satisfied with a diagnosis of tuberculosis, but to search for and discover all contributing causes. Foci of infection about the teeth, in the tonsils, gall bladder, appendix, pelvis, or kidneys, may be doing more harm than an incipient tuberculosis. Re-examination of patients, at least every few weeks, may discover new lesions or overlooked former ones. A re-examination will often give you a broader perspective of the patient's disease.

General Examination.—The thorough study of each and every patient requires a general physical examination with an examination of the sputum, urine, blood; at least one blood Wassermann test; roentgen-ray study of the chest, blood pressure, and reflexes.

Differential Diagnosis.—This is important for the exclusion of other diseases which may resemble tuberculosis, especially in the larynx, and for the recognition of other diseases which may act as contributing causes.

Syphilis is usually the most important disease to exclude, because the syphilitic larynx may, and often does, closely resemble the tuberculous. The so-called "club shaped" arytenoids may be caused by luetic infection. Ulcers, either superficial or deep, may be caused by syphilis.

Carcinoma may produce nodules closely resembling tubercles and the ulcerated areas may be mistaken for tuberculous ulcers. Even the pain of cancer is increased by swallowing. The age of the patient, the condition of the lungs, are differential points. Tuberculosis of the larynx is most frequent from 20 to 45 years of age. Cancer is most frequent after 50.

A papilloma closely resembles a tuberculoma. The microscopic examination following removal, should readily reveal the difference. Staining will usually show tubercle bacilli in a tuberculoma. Giant cells are not necessarily diagnostic

of tuberculosis. Prolonged irritation may produce them in other tumors.

Actiomycosis is rare, but it does resemble tuberculosis sometimes. A small laryngeal nodule may be mistaken for a tubercle. Biopsy should reveal the ray fungus in the microscopic sections. The disease occurs most frequently in farmers and ranchers.

Lupus is extremely rare in this country. The very slow development of the lesions with the relatively few and mild subjective symptoms helps to differentiate lupus from tuberculosis. Lupus is often present on the face also.

Chronic catarrhal laryngitis rarely produces any nodules or tumefactions in the larynx as objective symptoms. Aphonia is less frequent, although hoarseness is common. Rest of the voice and treatment produce more improvement than in the other types of laryngitis.

Cough may be, and often is, a symptom of any type of laryngitis. Sputum may or may not be present. The physical examination of the patient, and particularly the chest, combined with roentgenograms of the chest, a blood Wassermann test, biopsy, and sputum examinations, all must be used for differential diagnosis in doubtful cases. Consultation is of great value in difficult cases.

TREATMENT

Several very important methods of treatment are at the laryngologist's disposal. The one or ones selected must be determined by the extent of the laryngeal disease. If there is very little involvement, such as infiltration of the posterior laryngeal wall, whispering or absolute silence may be all that is required. Sir St. Clair Thomson[6] attributes the cure of his own larynx largely to silence. Frequently repeated local applications to the larynx often do more harm than good and they do not give the larynx, or the patient, the much needed rest.

If the infiltration is more extensive, heliotherapy may be indicated, provided the patient's fever is not too high, and the internist is willing to have the patient sit up in bed or in a chair long enough each time daily to permit adjustment of the solar laryngoscope. The larynx should be exposed to the sun's rays for ten seconds daily for the first week. The length of each treatment may be increased by five seconds each week, if well tolerated, until the larynx is exposed for ten minutes each day. It is very important to have direct sunlight, because glass filters out the actinic or ultra-violet rays. Even dust on a screen may do the same. The heat rays are not so easily filtered out. Infiltrations and superficial ulcers can often be made to disappear by the action of the sun's rays.

While using the solar laryngoscope the patient soon learns to see his larynx and to study its appearance. This gives a tremendous incentive to cooperation and an ultimate cure. Patients realize, as they can in no other way, what the laryngologist is trying to accomplish. The smile which lights the patient's face when he has seen his larynx distinctly for the first time, is worth working for. The treatment has ceased to be drudgery and has become a pleasant and profitable pastime from that time on.

Over-enthusiasm on the part of the patient or the laryngologist is not best. The larynx can be easily sunburned by too long exposures. Small vesicles may form and rupture later. Some patients believe if a little sun light is good for the larynx more will be better.

Exposures of the larynx for 20 minutes once, or even twice a day, after weeks of treatment may be beneficial. For the first few weeks of treatment the exposures should be shorter, as previously mentioned.

The cautery is usually best for extensive infiltrations and ulcerations. It can be used readily, under local anesthesia, by either the direct or indirect method, and the reaction following its use is almost nil. As many as three to six lesions may be cauterized at one sitting. It is not necessary to destroy all of a tubercle, because the fibrosis which results from the cauterization will destroy the tubercle. It is this fibrosis which is so desirable for an arrest and an ultimate cure, not only in the lungs, but in the larynx as well.

The cautery should be held very near the lesion to be cauterized and the current turned on. The platinum point should not be introduced into the tissues of the larynx until the point is at a white heat. A red point will adhere to the eschar, and will pull some of the escharotic tissue out with it, thus leaving a bleeding point. At a white heat the tissue does not adhere to the platinum point, and the wound is left sealed instead of open and bleeding.

Amputation of the epiglottis does a great deal of good in relieving the pain of swallowing if the epiglottis is tuberculous. The base of the epiglottis should be cauterized following the amputation. Personally I usually do this by the indirect method, and under local anesthesia. It seems less formidable to the patient and it permits expectoration of sputum as often as re-

quired. Tuberculous patients are usually not good risks for general anesthesia of any kind. The Moritz-Schmidt forceps serve very well for amputation of the epiglottis by the indirect method.

Local anesthesia may be produced by first spraying the larynx with a 2 or 3 per cent solution of cocain, and then applying on a cotton wound applicator, a 10 per cent solution every three minutes until five or six applications have been made. Personally I like to use Bruening's[7] laryngeal painting cocain syringe with a cannula for either direct or indirect application. The end of the cannula is milled and perforated, so that it will hold cotton wrapped on the end. Fresh cocain solution may be forced into the cotton through the perforations, every few minutes, from the syringe, and the cotton-tipped cannula applied as an applicator to the different parts of the larynx. The syringe also permits a drop or two of cocain to fall on the larynx during the latter part of the procedure, if so desired, and thus deeper anesthesia may be obtained. Great care should be exercised to avoid careless use of the 10 per cent cocain solution, however, because toxic symptoms may result.

Powdered cocain may be applied on a cotton wound laryngeal applicator instead of 10 per cent cocain solution. I have used both methods. A hypodermic of one-fourth grain of morphin sulphate, 1 hour before the time set for the operation, helps materially.

Artificial pneumothorax has been a very valuable method of treatment for pulmonary tuberlosis, and has undoubtedly lessened the dangers of laryngeal tuberculosis. It puts the collapsed lung at rest, diminishes cough, expectoration and fever; thus lessening the danger of infection of the larynx from sputum. Dworetzky[8] strongly advocates its use, not only for pulmonary, but for laryngeal tuberculosis as well.

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Physicians' Building.

Discussion follows paper of Dr. LaRue, page 347.

TREATMENT OF LARYNGEAL TUBERCULOSIS*

By H. H. Briggs, M.D.,
Asheville, N. C.

In 1880, Morrell MacKenzie stated "the prognosis of laryngeal tuberculosis is always extremely unfavorable and it is not certain that any cases ever recover." A well known German authority in 1908 stated that "the cure of tuberculosis of the larynx is still today an exception." In 1923, St. Claire Thompson[1] reported the cure of 119 cases of laryngeal tuberculosis and stated that a complete repair of the larynx had been obtained in no less than 25 per cent of the patients with tuberculous laryngitis. He attributed this wonderful success first to the sanatorium regime, and to the prompt prescription of one or more of three chief methods of local treatment, namely, whispers, silence, and the galvano-cautery.

Prevalence.—The prevalence of pulmonary tuberculosis and the frequency of one of its most dreaded complications, laryngeal tuberculosis, need not be stressed before this body, since vital statistics are familiar to all.

Brown[2] considers it a complication in 25 per cent of pulmonary cases, and says that there were in 1921, 100,000 cases in the United States. Lockhart estimated that one-third of all cases of pulmonary tuberculosis had tuberculous laryngeal lesions. Bronfin and Markel[3] say it is present in 63 per cent, and L. de Regnier[4] that "it is rare to find a patient with chronic pulmonary tuberculosis without a laryngeal localization."

Fetterolf[5] in 1912 found at autopsy on 100 cases, dead of pulmonary tuberculosis, 83 per cent with laryngeal lesions and four doubtful.

Prophylaxis.—The aphorism, "A stitch in time saves nine", is perhaps nowhere in the field of preventive medicine better demonstrated than in the care of the larynx in cases of pulmonary tu-

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berculosis: 95 per cent of efficiency so far as end results are concerned is in prophylaxis, not treatment.

The most potent factor in producing a laryngeal complication is irritation. I doubt that we should often have an opportunity to observe a case of laryngeal tuberculosis were it possible to eliminate larygeal irritation, and to this end several factors are important. Every case of laryngeal tuberculosis except in the last stages of healing when free from temperature, should be in bed, and when his means will allow, in a sanatorium. The air should be free from dust and smoke, and should be further purified by abundant sunshine and sufficient rain.

Of greatest importance is rest of voice, meaning absolute silence, pad and pencil except where the lesion is confined to the epiglottis and is well progressing toward healing, when whispers may be substituted. The voice, next to cough, is the greatest menace to an inflamed larynx. Every case of tuberculosis should be instructed in modulation of the voice and impressed with the fact that the bulk of most conversation is utterly redundant. The talkative friend replete with interrogations may in one visit prove a greater menace to the patient's throat than all the millions of bacilli that pass that portal. I prescribe two placards in big bold letters reading "Silence", one to be placed on the patient's door, and the other pinned over his chest, and I am gratified when I find that the visitor has mistaken the prescription for himself.

Tobacco in any form should be prohibited, as should liquor and other irritating liquids or foods.

Cough.—The most irritating factor conducive to laryngeal tuberculosis in tuberculous patients is cough, and no stone should be left unturned to ferret out its cause and eradicate it if possible. Some reason that cough is a natural accompaniment to the chest condition and necessary in order to free the bronchi and trachea of excessive secretion, and therefore should not be treated or inhibited unless it keeps the patient from sleeping. This is not only mainly untrue, but cough is frequently not of pulmonary origin. It may come from any part of the upper respiratory tract and in such cases is an added danger not only as affecting adversely the lung condition, but as being the most potent and direct cause of laryngeal involvement. I have seen in tuberculous individuals with normal larynx a menacing non-productive reflex cough caused by acute and chronic infection of each and every accessory sinus, from diseased teeth, from acute and chronic otitis, and often from acute and chronic tonsillitis and pharyngitis. All such lesions of the upper respiratory tract including nasal obstruction should be corrected in every case if they are seen early enough to be corrected with safety to the patient. When the source of cough cannot be found and eliminated, then carefully selected sedatives should be used in barely sufficient quantities and at suitable intervals to control the cough, at the same time impressing upon the patient the necessity of his using his will power in suppressing the cough.

Applications to the larynx have been carried out by many conscientious observers and aside from the slight sedative and palliative effects have little to recommend them and ofttimes may cause an increased inflammation and progress of the disease. This is particularly true because of the irritating qualities of some drugs recommended and especially on account of the manner of their application. I am of the opinion that the trauma incident to applications to an already inflamed and irritable larynx as made by the average clinician does more harm than good.

Bland oil solutions of sedatives, such as very weak solutions of menthol, eucalyptol and guaiacol are agreeable and well tolerated when insufflated or inhaled. The majority of patients are not able and should not make visits to the physician's office. In fact, patients needing laryngeal treatment should be in bed. It is therefore, very fortunate that there is an exceedingly efficient method for the patient to give medical applications to his own larynx. The patient sits with head thrown well back so that the long axis of the pharynx, larynx and trachea are in a vertical position in the line of gravity. The solution at body temperature held in a large glass dropper or a soft rubber syringe is slowly instilled into the nose when it will quickly pass downward and backward and drop off the tip of the uvula into the pharynx; and if the patient will at this moment forcibly inhale through the nose, the mouth being closed, the solution will be carried not only into the larynx, but into the trachea and bronchi if necessary. This is also an easy and efficient method of medicating the trachea and bronchi and a valuable means of medicating an old bronchiectasis, the patient assisting in directing the solution to either side by inclining the body to the side affected. The principle indication for sprays and application to the larynx is for their cleansing effect.

Recurrent Laryngeal Injection.—Leichsenring and von der Hutton[6] first successfully injected and resected the recurrent laryngeal nerve for the purpose of paralyzing the motor fibres of the larynx, and therefore completely immobilizing one side of the larynx. Theoretically the idea was ideal, but it failed in popularity probably because of the difficult technic and the shock to the patient. I am hoping that some one may simplify the technic to something sufficiently conservative to adopt in cases where immobilization is urgently indicated.

Superior Laryngeal Nerve.—Considerable relief from pain at intervals in some cases may be had by successfully blocking the superior laryngeal nerve which is purely sensory and which supplies most of the larynx, except the epiglottis. Injection of 70 per cent alcohol is made near its point of entrance through the thyro-hyoid membrane, just above the superior border of the thyroid cartilage and about one inch from the center of the larynx in front. Ordinarily in an inflamed larynx, this point is sensitive to pressure and when palpated, firmly, or when the needle touches the nerve, there occurs through the corda tympani reflex, a sharp pain in the ear of the same side, which facilitates its localization.

A solution that is slightly antiseptic yet analgesic and soothing, is iodin 0.1 per cent, menthol 0.25 per cent, eucalyptol 0.5 per cent, guaiacol 0.5 per cent in albolene, or some other bland oil.

External applications to the larynx give little relief except that in some cases the pain may be slightly relieved by blisters to the side of the larynx over the entrance of the superior laryngeal nerve.

Electro-cautery is proving by far the greatest means of combating the tuberculous lesion. It should be used in conjunction with all the other means enumerated and only when other treatment is not promising.

Thompson found it indicated in 20.22 per cent of 187 cases treated. Of 74 cases in which galvano-cautery was used 46 cases were cured. These cases of course had been under silence. It is especially effective in lesions of the intrinsic parts, about the margin of the glottis, vocal cords and interarytenoid region, and when the process is quiescent and not progressing. It is also indicated when the lesion is limited to the ventricular band or epiglottic fold and of the indolent type. Thompson considers it unsafe if the arytenoids are actually involved or there is pericondritis or involvement of the trichoarytenoid joint. Unstable temperature, and poor resistance, may be contra-indications.

Other observers however, are more bold and use it in more acute stages even where the infiltrating process is rapidly extending. The many factors in the patient's general condition, as well as the local lesion should be considered when deciding on any extensive use of the cautery. But in well selected cases, when properly applied at suitable intervals, it is our most efficient means of combating an otherwise irresistible process.

Tracheotomy.—Tracheotomy shows the most gratifying statistics on the cure of tuberculous laryngitis. It is true that these operations have been done for the most part from necessity for stenosis or edema of the larynx and not for the ordinary lesion, *per se*. Notwithstanding, in almost every instance, immobilizing the larynx incident to the operation has resulted in cure of the larynx. I have done five such cases where cicatricial stenosis, infiltration, and tuberculomata have necessitated tracheotomy and usually an emergency operation, which have resulted not only in a cure of the laryngeal lesion, but each patient is still alive after intervals of from three to ten years. This procedure is of course radical and I am not advocating it from general use, but there are cases where it might be used with a promise of relief from pain to the patient and the possibility of life. Such patients are more comfortable, have less cough, less secretion in the larynx and far less pain due to the immobilization of the larynx, all of which is conducive to healing.

Heliotherapy.—Next to good food and fresh air, heliotherapy is probably of greatest value in the treatment of tuberculosis of any organ and in any stage of the disease. Just as the lack of sunlight may lower the resistance of the body and invite tuberculous infection, so its use tends to restore that resistance. Moreover, when it is applied to the tuberculous lesion or even on the surface of the body, there results a tissue reaction liberating tuberculin in the system. Heliotherapy should be slowly begun and carefully increased in order to avoid a systemic tuberculous reaction. The Europeans, especially, the Swiss, Italians and Austrians have written voluminously on the virtues of heliotherapy and used it extensively. The results in their sanitoria are most convincing, and I fear American physicians are sadly neglecting to give their patients the benefit of one of the most valuable

and at the same time, the most inexpensive forms of therapy. It should be remembered that 85 per cent of the beneficial actinic rays of sunlight are filtered out in passing through the glass window.

Tuberculin.—Tuberculin is a powerful means of stimulating cell activity in a tuberculous lesion and therefore a dangerous drug when used carelessly, without a knowledge of the patient's general condition, his pulmonary lesion, his exact laryngeal and other complicating lesions, and his probable reaction to the drug. When his general condition does not contra-indicate the use of tuberculin, the larynx may in itself furnish an indication for its use. This would be evidenced by arrested activity in the infiltrative and uncerative stages, evidence of fibrosis, and the formation of tuberculomata, there being no cough or temperature and above all, a sluggishness of the lesion.

But in every case, the initial dose should be exceedingly small and the increase very gradual in order not to produce a decided reaction, which may cause a renewed activity, both in larynx and lung.

As a rule the use of tuberculin, heliotherapy, internal medication, in fact, the patients' general care should be in the hands of a competent general physician, or internist, who has made tuberculosis his special study.

Gravity of the Condition.—The sad plight of the poor victim of laryngeal tuberculosis with his racking pain leading to the further pangs which his enforced starvation adds to his miserable existence, is enough to stir the pity of any clinician and to urge him to try every reasonable means possible for both humanitarian and scientific reasons. The general belief that the laryngeal lesion is a local manifestation of a general disease and that it in the main keeps pace in progress with the pulmonary condition, is true, but it is not necessarily true; for in many cases the laryngeal lesion once started shows no relationship to the pulmonary lesion and may spread like wildfire to the end. Such cases frequently hasten the end where the pulmonary condition was not threatening the life of the patient, and of course the reverse is also true: an acute pulmonary exacerbation may hasten the end when the larynx is improving. The prognosis of the laryngeal condition should be based not solely on the general condition, but also on the patient's resistance, his environment, his control and perhaps on the clinician's willingness and ability to cope with the problem at hand. The successful treatment of laryngeal tuberculosis necessitates suitable environment, the efficient care of a physician versed in tuberculosis, full co-operation and mutual confidence between patient and physician, and a laryngologist who is willing to make the necessary sacrifice of time, study and attention which the patient requires and which the practice of laryngology demands.

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Discussion follows paper of Dr. LaRue, page 347.

OBSTRUCTIVE TUBERCULOSIS OF THE LARYNX*

By JOSEPH B. GREENE, M.D.,
Asheville, N. C.

No more distressing condition confronts the physician than the symptoms of air hunger due to an obstructive lesion of the larynx. Pain of severe type can usually be relieved by morphia, but this unfortunately, is not the case in laryngeal dyspnea. Symptoms of laryngeal obstruction are most commonly associated with diphtheria, benign and malignant tumors of the larynx, syphilis, foreign bodies, retropharyngeal abscess, and edema. Tuberculosis of the larynx, though less frequent as a cause of laryngeal dyspnea, is, on account of its seriousness and ease of relief, worthy of our earnest consideration.

Pulmonary tuberculosis is still one of the most common diseases which we as physicians are called upon to treat, and the larynx is most frequently involved as a complication. Statistics show that, considering all stages of tuberculosis, about 20 per cent have a laryngeal complication, and of fatal cases about eighty per cent (Fetterolf) show a laryngeal involvement at autopsy.

When one considers the complex structure of

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the larynx, its nerve supply and the small calibre of its aperture, which is about one-half the size of the trachea, we can better understand the relatively frequent occurrence of laryngeal dyspnea. Tuberculous stenosis of the larynx may be caused by tumor growth, or exuberant granulations within the larynx, directly occluding the glottis. In one of my cases requiring tracheotomy there was noted a tumor mass projecting from under each chord, almost touching in the median line. There was also some interference with the movement of the chords on inspiration which further reduced the calibre of the larynx. In my experience, the most frequent cause of stenosis of the larynx is overproduction of scar tissue with some infiltration in the post-commissure interfering with the action of abductors of the larynx (crico-arytenoidei postici). My last three cases were of this type, though one of these had in addition a tuberculous mass in the anterior commissure interfering with the movement of the chords.

Edema or massive infiltration of the arytenoids, especially when there is an extension forward involving the arytenoid folds, may cause occlusion of the larynx with symptoms of obstruction. Massive swelling of the epiglottis is mentioned by Lockard as a cause of obstruction, though I have not encountered this type. Double abductor paralysis with the chords almost approximating in the median line on inspiration, with a mild pathological condition in the larynx, may cause laryngeal obstruction. This condition has seemed to me to be due to inflammatory action on the muscles of the larynx rather than to a weakness of the nerves themselves. However, as to this opinion, one cannot speak with positiveness.

In this type of case the symptoms may come on suddenly requiring immediate tracheotomy. In one of my cases the condition of the patient was so alarming that it was only the timely introduction of an intubation tube which saved me from the necessity of a precipitate tracheotomy. There is observed at times a true recurrent nerve paralysis, usually on the left side, probably due to pressure of a bronchial gland or a thickened pleura. The left chord in such cases is seen motionless in the so-called cadaveric position, the only symptom being hoarseness.

Tuberculous involvement of the crico-arytenoid articulation of both sides may bring the chords in close apposition in the median line, a type of stenosis difficult to distinguish from that of abductor paralysis.

The symptoms of dyspnea usually come on gradually, lasting over a period of weeks or even months, though in the case of abductor paralysis, and others due to edema, the onset may be sudden. The patient at first notices slight dyspnea, worse on exertion, and there is some increase in respiration. As the stenosis gradually increases the restlessness becomes more marked, with disturbance of sleep. There is soon noted some stridor, especially on inspiration, and there appears a retraction of the supraclavicular and intercostal regions, due to the action of the accessory muscles of respiration. Examination of the larynx will confirm the diagnosis already suspected from the symptoms. As these cases practically always occur in adults, indirect inspection of the larynx with a mirror is all that is usually required. Lividity is not to be looked for save as a late symptom when the heart muscle shows signs of weakness.

As prevention in medicine is far better than efforts at cure, an early diagnosis of laryngeal tuberculosis should be made in order that appropriate treatment may be instituted. This point has been well emphasized by Spencer. Sanatorium treatment affords rest to the larynx, and the body as well, and where the throat condition is under the watchful care of a laryngologist, offers the patient the best chance of a cure or an arrested state. The electro-cautery, in suitable cases, is the best single measure in the treatment of tuberculosis of the larynx. Its timely use will often limit the fibrosis and diminish infiltration, in this way lessening the chance of an ultimate stenosis. However, it is well to bear in mind that the injudicious use of the cautery, applied too deeply or too frequently in the posterior commissure, may be a factor in the causation of stenosis.

When symptoms of laryngeal dyspnea appear, it is important to determine chiefly the pathological condition of the larynx causing the symptoms, in order that appropriate treatment may be instituted. When there is obstruction due to massive infiltration, granulation or edema, igni-puncture will at times cause shrinkage and spare us the necessity of a tracheotomy. If the epiglottis be large and obstructive it should be removed surgically. Where dyspnea is due to scar tissue in the posterior commissure, or to abductor paralysis, tracheotomy should be at once considered. It is not wise to postpone too long the giving of relief, bearing in mind the harmful effect of obstructive breathing both on the pulmonary and the general condition.

For the relief of dyspnea, intubation has no

place except as an emergency measure pending the operation of a deliberate tracheotomy.

At this point it may be well to speak a word of warning against the use of morphia in obstructive lesions of the larynx. This has been emphasized by Jackson and his associates. The use of this sedative drug tends to deprive the patient of much needed accessory muscles of respiration. The failure on my part to observe this precaution in one case brought me to the necessity of intubating in order to avoid a hurried tracheotomy.

Stenosis, when due to increase of scar tissue in the posterior commissures, is usually permanent, and efforts at dilatation are not to be recommended. Obstruction due to infiltration, granulation or edema may subside sufficiently to permit the tracheotomy wound to close after a considerable period of time. However, such a favorable outcome is not to be expected.

It is often surprising what a marked improvement in both the general and pulmonary condition follows a tracheotomy. One patient in my care at the present time, operated upon two years ago, has gained forty pounds in weight, and we can note marked improvement in her chest condition.

Where the operation of tracheotomy is performed for stenosis not due to increase of scar tissue in the posterior commissure, an improvement in the laryngeal condition should be expected.

It is neither necessary nor desirable to describe in detail the operation of tracheotomy bebefore this Section, so I shall speak of only a few points in this surgical procedure. In the first place, general anesthesia is not to be considered, local anesthesia, novocain with epinephrin being all that is required. Children, fortunately, are rarely affected with laryngeal tuberculosis, and in consequence are almost immune to this type of stenosis.

Jackson and his associates describing tracheotomy in general strongly advise a low tracheotomy, wishing to keep well away from the larynx. For some reasons this seems desirable, but on account of certain disadvantages, I am inclined to agree with Sir St. Clair Thompson in recommending that the incision be made into the second and third, or preferably the third and fourth rings of the trachea. In favor of this is the ease of operation. The objection to the low tracheotomy is the greater depth of the trachea and its close proximity to important blood vessels. The high operation, which by some might be termed median, necessitates the cutting through the isthmus of the thyroid. This can be grasped by clamps or forceps before incision better to control bleeding. Mosher has suggested this method. It is advisable to suture vessels encountered in this region rather than to trust to simple ligation. When the trachea is well exposed at the point selected and all bleeding controlled, a few drops of the novocain solution should be injected between the rings of the trachea. An incision is then made through two or three rings of the cartilage, and while the assistant holds open the trachea with the forceps or retractor, a 4 per cent solution of cocain with epinephin is sprayed into the trachea. This lessens the slight oozing from the mucous membrane and, what is more important, spares the patient the violent paroxysm of coughing incident to the insertion of the tube. To Lynch I am indebted for this useful suggestion. The wound should not be too tightly closed by sutures, due allowance being made for post-operative swelling. In addition to the usual post-operative care of such cases, I am in the habit of inserting a few drops of sterile hydrocarbon oil into the tube every few hours. This tends to prevent the drying of the secretions in the trachea, which may cause an obstruction similar to that of a foreign body.

SUMMARY

(1) Laryngeal dyspnea in tuberculosis occurs with sufficient frequency to warrant directing our serious consideration towards its prevention and relief.

(2) Treatment of this condition differs from other forms of stenosis in that it practically always occurs in adults and in those affected with pulmonary tuberculosis.

(3) Tracheotomy is preferable to intubation and the operation should not be too long delayed.

(4) It is dangerous to give morphia for relief of symptoms in laryngeal dyspnea.

(5) Tracheotomy just below the first or second ring of the trachea, on account of the ease of performance, seems preferable, though some (Jackson) advise a low tracheotomy.

(6) Sterile hydrocarbon oil should be frequently inserted into the trachea tube as a measure to prevent obstruction due to dry inspissated secretions.

Discussion follows page of Dr. LaRue, page 347.

PROGNOSTIC VALUE OF LARYNGEAL TUBERCULOSIS*

By CLAUDE L. LARUE, M.D.,
Shreveport, La.

Most writers in discussing the subject of prognosis in laryngeal tuberculosis consider only the larynx and its function, paying little attention to the disease as related to mortality. Fatalities are considered if they occur during the course of treatment, but usually patients are not observed long enough after leaving the sanitarium for us to know much of the permanency of their cures. A follow-up program furnishes most valuable and otherwise unobtainable information as to their final outcome and the knowledge thus obtained helps to forecast more accurately the outlook for similar patients. That idea forms the basis for this study, although the ordinary factors more commonly considered in forming an opinion as to prognosis are also briefly mentioned. A discussion of this subject is justified perhaps for the following reasons: first, because of the somewhat conflicting opinions as to prognosis held among laryngologists, and secondly, because the tuberculous patient is justly entitled to know, with some degree of accuracy, what the advent of laryngeal complication may mean to him. The latter includes the humanitarian aspect which has to do with the justification of denying this patient the use of his voice, and the privilege of living at home rather than in a sanitarium, if his life cannot thereby be prolonged.

Prevalence.—The prevalence of this disease naturally has a direct bearing upon prognosis. If it is actually more common than is usually supposed, the death rate remaining constant, prognosis is relatively better than is generally stated. Difference of authoritative opinion as to its prevalence reverts to the question whether or not mild chronic laryngitis in the consumptive, is of tuberculous or of non-tuberculous origin. For various reasons and especially because of autopsy findings in these early infections, the writer believes that practically all cases are tuberculous and that laryngeal tuberculosis is an exceedingly wide-spread complication of the pulmonary form of the disease. It is well known that many early cases go on to complete recovery without the patient's ever suspecting the presence of disease. Such infections are often discovered among the unsuspecting at periodic health examinations. Furthermore, the experiences of those clinicians in charge of our numerous tuberculosis sanitaria bear out the idea of the extreme frequency.

Brown[1] says: "Laryngeal tuberculosis occurs in about 25 per cent or more of adults with pulmonary tuberculosis, and in the United States one hundred thousand people have the disease."

Lockard[2] thinks that "one-third of all persons with recognizable lesions in the lungs have complicating lesions in the throat; that autopsies upon individuals dead of consumption prove that nearly 50 per cent have tuberculous lesions in the larynx". Other writers[3] say that it "is present in at least 63 per cent of the tuberculous", while still another[4], goes farther by saying: "It is rare to find a patient with chronic pulmonary tuberculosis who does not have in the course of his disease a laryngeal localization". Sir St. Clair Thomson[5] thinks there are more than one hundred thousand cases now existing in England and Wales. Mullin[6] declares the disease to be universally common and thinks those laryngologists who believe otherwise, simply fail to recognize the condition when they see it. Further evidence as to frequency is furnished by pathologists of wide experience, among whom is Esch[7], who reports as follows: "A large number of larynges were taken from persons who had coughed a great deal during the last period of their lives on account of non-specific diseases of the lungs." Compared with this group was another group of ten larynges from persons dying with pulmonary tuberculosis, but whose larynges showed no macroscopic change. Eight of these ten varied markedly from those of the first group in that they "showed histologically undoubted tuberculous changes. Solitary tubercules were found in the sub-mucosa, directly beneath the epithelium as a rule. They consisted of a center of epithelioid cells with single or several giant cells". Thus the disease is positively demonstrated in 80 per cent of larynges examined from tuberculous individuals in which larynges there was not even macroscopic sign of trouble.

American medical statisticians believe that for every case of tuberculosis dying during a given year there are ten cases living, and that one out of every three of these has laryngeal involvement. In 1925, Missouri, a state of average size and population, had 3186 deaths from tuberculosis. Figuring on this basis there were then 31,860 pulmonary sufferers among whom there were 10,620 tuberculous larynges. New York state, the same year had 10,466 such deaths giving it 104,660 living consumptives with 45,886 laryngeal complications[8]. If these figures are discounted even 50 per cent to allow for the enthusiasm of their authors, it still remains demonstrated that the disease is exceedingly common.

Diversity of Medical Opinion.—As to the prognosis it may be said that few conditions have the distinction of such diversity of opinion as this one. Medical writings, especially text books, are very indefinite and conflicting in their state-

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ments. A most capable authority[9] in his recent splendid text book says:

"The local treatment to the larynx is practically of no curative value, and only palliative measures have a place in the management of this disease". An equally eminent writer[4] says "Larygeal tuberculosis is exceedingly amenable to treatment. The prognosis, except in young infants, and cases complicated by syphilis is relatively benign, since cure is not the exception, but the rule". Another writer[10] said, last year, that he "regards the prognosis as bad, and does not, at present recall recovery of any well established case".

What is the reason for this difference of opinion and cannot something more definite be given the patient and his physician? In the first place, a fault lies among us as specialists if we attempt to consider the organs we treat as separate and distinct from the remainder of the human body. The patient is concerned vastly more with his prospect for life than with the function of his larynx. The one place in which we must step beyond our limited field, is in giving a prognosis in this disease, because if we do not know something of the general resisting power of the body and a great deal about the pulmonic condition it is impossible even to estimate the outlook. Strictly speaking, laryngeal tuberculosis cannot have a prognosis of its own because it always accompanies the pulmonic disease and the two are so interdependent, that a consideration of one to the exclusion of the other is impossible. Yet the laryngeal complication has a positive, definite and adverse influence upon the longevity of every pulmonic sufferer in whom it develops. A plea is made for the adoption of some standard by which patients will obtain consistent and fairly accurate information as to their future from any well informed laryngologist whom they may consult.

In general, it may be said that the prognosis is better and the disease less frequent, (especially the advanced type), than it was thirty or forty years ago. In the eighties Mackenzie[11] said:

"The prognosis of laryngeal phthisis is always extremely unfavorable and it is not certain that any cases ever recover". As to the change in its frequency even during the life time of one writer, Mackenzie[12] says: "Amongst our most frequent visitors to the clinic were cases of tuberculosis of larynx. They literally abounded. They came by the hundreds in striking and conspicuous contrast to the comparative rarity of this disease in the throat clinics of today". Thus we see some signs of favorable progress, yet this change has undoubtedly been due to advance in methods of early diagnosis rather than improved methods of treatment. At that time cautery and sunlight had been used; and for pain, injection of the superior laryngeal nerve and amputation of the epiglottis had been performed. Outside of certain palliative measures we have not made rapid strides recently in its treatment.

CHIEF FACTORS IN PROGNOSIS

The final outcome of no disease seems to depend upon so many factors as does this one. The most important of these in the opinion of the writer follow, and before offering a prognosis in any given case, we should give careful consideration to each of these points.

(1) *Location and type of lesion in the larynx.*—The most favorable location is the posterior wall and the least favorable, the epiglottis. The death rate in epiglottidean tuberculosis, whether it complicates advanced or incipient pulmonary disease is practically 100 per cent. The true cords have amazing resistance even to deep ulcer, and function remarkably well even after dense cicatrix follows widespread sloughing. Mucosal thickenings are more favorable than deep seated infiltrations while ulcerated areas, for example, in the arytenoids react surprisingly favorably to cauterization. Widespread invasion is, in general, less favorable than the circumscribed, if for no other reason than that, the cautery cannot be applied effectively. It may then be said that intra-laryngeal lesions are more favorable than extra-laryngeal lesions, for instance, in the epiglottis or ary-epiglottic folds.

(2) *Chronicity of the Lesion.*—The large amount of cicatricial tissue observed in a healed larynx, bespeaks the desirability of chronicity rather than of acute inflammation. An acute tuberculous larynx never heals as such, the scar following rather the chronic infection. Hence the uncertainty of prognosis in this stage. The presence of grayish deposits, generally tubercules, easily seen beneath the mucosa of acute cases means a graver outlook than if the infiltration appears more firmly organized, suggesting fibroid changes.

(3) *Individual Resistance.*—This is a factor of considerable importance without doubt, but its determination is difficult. The differential blood count seems a helpful index. Reaction to exercise both vocal and general has seemed to me a fairly good criterion. The least exertion in some patients even some months after apparent cure, causes an otherwise unexplainable temperature rise, while other patients who seem less well, can do rather strenuous exercise without fever. This can be explained only on the so-called "resistance" theory, a thing we know little about. Closely associated and likewise unexplainable is the personal disposition factor. Some patients are of such an active and un-

stable temperament that it is impossible for them to rest well enough and long enough to recover, while a few are so plethoric and inactive, that they will not exercise when it becomes indicated and essential, and they remain "soft", as their friends describe it.

(4) The fourth factor is the pulmonic condition. So closely related are the two that the term "laryngo-tuberculosis", previously suggested by some one else, should be used. Never can the outlook be accurately foretold without definite information as to the pulmonary status. Although the prognostic opinion based by some internists entirely upon the lung condition is faulty, it is usually more accurate than that of the over ambitious laryngologist who sees the larynx only, and, knowing nothing of the lungs, offers a prognosis. Often the larynx, under treatment, will improve while the lung disease progresses, sometimes the larynx being completely cured only a short time before death from the lungs. On the contrary I have never known of pulmonic improvement, co-existent with spread in the larynx. The belief that laryngeal complication is present only in advanced pulmonic infection is erroneous, although the percentage is much smaller in the incipient cases. That idea is also a dangerous one, because physicians holding it do not watch their early cases, and lessen the chance of cure because they discover the complication too late.

(5) The fifth essential in forming an opinion concerns the present condition of the larynx in only a relative way. After everything ascertainable about the patient both local and general, mental and physical, present and past, is sized up and carefully weighed, then we should ask this question: what has been the condition five to ten years later of similar patients? To have at hand this information requires the follow-up study mentioned, and, now becoming more popular with the larger hospitals through their social service departments. It affords a valuable prognostic aid in all diseases, but especially in tuberculosis.

Sir St. Clair Thomson[5] some three years ago, advanced the idea that not only is a knowledge of the patient's welfare during sanitarium days necessary, but that he should be followed up after returning home, in order to determine the permanency of the supposed cure.

Carrying out this idea the writer sought to learn the present condition of patients treated and apparently cured several years ago. While a great deal of my investigation has necessarily been by correspondence, nevertheless, the results are definite enough conclusively to warrant the darkening of the outlook of other patients. By far the majority of those looked up have failed to survive a five to ten year period, although in most of them at the time of discharge the future seemed quite promising. Death was often reported to have followed acute pulmonic exacerbation, with or without recurrence in the throat. In others there was fatal extension into the intestine, or meninges, while some died from hemorrhage, and still others succumbed to diseases like pneumonia, to which the laryngeal and pulmonic tuberculosis were evidently predisposing. One group of our cases[13] was composed of the patients with laryngeal complications among the 192 private pulmonary tuberculous patients in the service of Drs. Gilbert and Groom[14] during a given period. Among them were 23 persons who had at one time or another during their hospital stay, definite laryngeal invasion. The other 169 had not. Six years have passed and of the 169, 70 per cent of 124 persons are living, while 30 per cent or 45 persons are dead. Of the 23, however, who had also the laryngeal involvement, only seven are living or 34 per cent while sixteen or approximately 66 per cent are dead. This series, although small, is a fair index to the sum total of all cases. It indicates positively that the outlook for longevity is greatly reduced among the tuberculous if the laryngeal complication occurs.

Sir St. Clair Thomson[5] has made an extensive follow-up study of his many cases and draws valuable conclusions. I quote him as follows:

"Of the 2541 patients with pulmonary tuberculosis who were discharged from the King Edward VII Sanitarium, Midhurst, between 1911 and 1921, the proportion of those alive between one and ten years later, was amongst those with a sound larynx, double that of those with tuberculous laryngitis. Of patients found to have tubercules in the larynx during these ten years, two out of every three were dead. Of those with a sound larynx it is the reverse—two out of every three were still alive. Of all the four hundred seventy-seven cases of laryngeal tuberculosis which passed through my service at Midhurst between 1911 and 1921, no less than 70.5 per cent are now dead . . . . . Therefore, laryngeal tuberculosis cannot be listed in any group which may be termed "slight" or "favorable". Its discovery at once labels a case as "severe" and authorizes a physician to warn his client that treatment will necessarily, even in the most hopeful cases, be long and arduous. In only too many instances, (70.5 per cent), it will be his duty to advise the friends that the prospect of recovery is so slight that it may be unjustifiable to submit the sufferer to any trying, dangerous or expensive treatment."

One might think that the laryngeal complication comes only among the advanced pulmonic

cases, and thus accounts for the high mortality. Statistics show, however, that this is not the case. The larynx, frequently becomes involved very early. In fact the "husky voice" often is the first indication of disease, and even frequently leads to discovery of unsuspected tuberculosis in the lungs. In fact, the 70.5 per cent mentioned by Sir St. Clair Thomson as doomed to die in a few years are of his "fairly favorable cases."

CONCLUSIONS

(1) There should be greater uniformity of opinion among laryngologists in offering a prognosis to laryngo-tuberculous patients, or their attending physicians, especially as concerns life.

(2) That opinion should be based somewhat upon findings in the given larynx, but primarily upon the pulmonic condition.

(3) Accuracy can be approached only by applying a knowledge of the final outcome of similar patients who have been followed for several years after their apparent cure and after their re-entry into the stress of home life.

(4) In general, it may be said that the advent of laryngeal invasion in any tuberculous patient greatly reduces his chances for recovery. Without considering any of the particular aspects, such as location and type of lesion, age and resistance of patient, or pulmonic condition, it is fairly accurate to say that two out of every three of those afflicted with pulmonary tuberculosis without laryngeal complication, will make a permanent recovery, while of every three who have also laryngeal tuberculosis only one will permanently recover.*

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*Originality is not claimed in this paper, ideas and quotations being freely taken from writings of Sir St. Clair Thomson, and others, for which credit is hereby given.

DISCUSSION—*Abstract*

Symposium on Laryngeal Tuberculosis—Papers by Dr. Spencer, Dr. Briggs, Dr. Green and Dr. LaRue

Dr. Charles L. Minor, Asheville, N. C.—A valuable early diagnostic sign which Dr. Spencer did not mention is Dr. Casselberry's triangular fissure at the juncture of the chord and the arytenoid, which occurs in no other condition. A slight thickening and elevation of the posterior commissure with a groove down its center occurs very early and has great diagnostic value. A unilateral thickening and reddening of the edge of the chord or a similar condition of the edge of the epiglottis comes very early. Your branch of the profession would see these cases earlier and therefore learn to recognize that earlier, if the lung specialist examined the throat of every patient that came to him. Unfortunately you generally get the cases when they are well advanced. Hence the treatment is more difficult and your idea of the prognosis is unduly bad. The general practitioner and the lung specialist should learn to use the laryngeal mirror easily and make it a part of their thorough examination.

As to treatment, I would refer only to treatment in the earlier stages. Rest is invaluable but chiefly in lesions in the posterior commissure and in the cord. Silence for some people has a very depressing and harmful effect, in which case whispering should be allowed. Any patient with laryngeal abnormalities should himself use a good alkaline spray every four hours for cleanliness, following it by a spray of menthol, oil of eucalyptus, oil of gaultheria and hydrocarbon oil. While this is not curative it is wonderfully healthful to the larynx and puts the throat in much better shape.

In the early infiltrative forms of tuberculosis of the larynx, the insufflation of equal parts of iodoform and calcium carbonate three times a day which liberates nascent iodine has a very remarkable effect in causing the reabsorption of the infiltrations.

I have been watching my colleague, Dr. Greene, using the cautery in laryngeal tuberculosis, and have been delighted with the results. Delicately and skillfully applied it has saved some very bad cases.

Finally, let me urge the profession to be more optimistic with the cases of laryngeal tuberculosis. If they are seen early the prognosis is good, but early or late the effect of hope is wonderful and we should not deprive the patient of this invaluable remedy. It puts fighting power into him and changes the outlook in many a case. We have talked pessimistically about this disease too long. Our business is to learn to recognize it early and thus to obtain good results with it.

Dr. S. J. Chapman, Colorado Springs, Colo.—The first point which I wish to emphasize in the treatment of laryngeal tuberculosis is the importance of silence. Silence means, complete silence, not whispering. The muscle movement in whispering must put the lesion under almost as great a strain as that involved in talk-

ing out loud. In the very beginning the patient should be given a pad and pencil and should be impressed with the great importance of absolute rest of the larynx.

Dr. Briggs has mentioned that coughing is one of the things that helps to retard the cure of tuberculosis of the larynx, and certainly talking does increase the amount of coughing. Silence in people who have only pulmonary tuberculosis, has given some fairly good results. Dr. Briggs mentioned sun treatment, and I understand that he was referring to general therapy. Reflected sunlight is well worth using. It is obtained with a solar laryngoscope and mirrors made of an aluminum and magnesium alloy which reflect a great portion of the actinic rays of the sun. Lesions of the larynx, since they are superficial, are peculiarly adapted to the use of the direct sunlight. Also, the patient probably takes more interest himself in the cure of his lesion if he can see it and watch it progress.

The Kromayer lamp is very good, particularly in cases that run a little temperature and are not in condition to get up and go outside to take the sun. I have seen some rather striking results with its use.

Sanatorium treatment is also important. Patients are more willing to carry out the treatment in a sanatorium because there are others around them doing the same thing. They write to each other and are more content to be silent.

The laryngeal lesion that heals with firm cicatrization, has no tendency to recur. I have seen these patients die of pulmonary tuberculosis without recurrence of the laryngeal lesion.

Dr. Wm. J. Greenfield, Memphis, Tenn.—What, in your mind, is the incidence of primary laryngeal tuberculosis?

Dr. Edward A. Looper, Baltimore, Md.—Important work has been accomplished by education in general tuberculosis. We should impress strongly upon the general practitioner as well as the specialist that as soon as a case of tuberculosis is recognized, the larynx should be examined not once but at repeated intervals. In our cases of tuberculosis at the State Sanitorium of Maryland, we have monthly examination of the larynx. We instruct the interns in making these examinations and hold them responsible in warning us of the first suspicious symptoms.

With the cautery we can accomplish in one application what could be gained by weeks of silence. As soon as tuberculous lesion of the larynx is recognized, cauterization should be applied as soon as possible. Of course when a case comes to the hospital we do not begin cauterization until we get the temperature down, and make an effort to get the patient in as good physical condition as possible. To attempt to treat these cases in the home or at your office is a great mistake, does harm and seldom gives good results. Many times we see these cases so late that it is hopeless. By routine examination we discover some cases early which do not present any subjective symptoms at all. Most of these cases can be cured, and the prognosis will improve all the time, depending upon their early recognition and treatment.

Dr. William L. Dunn, Asheville, N. C.—While I am not a member of this Section I am very glad to have an opportunity to say a word. Certainly all of us who have waited over to the last minute to hear these papers have been well repaid. It seems to me that it would be a serious mistake to us to let go unchallenged the simple statement that the "prognosis of laryngeal tuberculosis is bad". From a laryngologist standpoint, I think that this is quite true, largely, however, because he is in the same place that the "lung man" was many years ago, the cases are not referred to him until they are far advanced. In general, the outlook for advanced laryngeal tuberculosis is bad, but I do not think we can substantiate the statement that the prognosis of laryngeal tuberculosis, as a whole, and particularly when the diagnosis is made as early as it can be and should be made, is bad. Let me make it quite clear at this point that the responsibility is not the laryngologist's, but ours, those of us who refer these cases to him.

Any one who has had an extensive experience with the use of tuberculin as a therapeutic agent, and who has systematically watched for reactions in the larynx after its administration is slow to make a diagnosis of simple or chronic laryngitis in a patient with pulmonary tuberculosis.

I agree with Dr. Greene, that the cautery is the best single measure in the treatment of laryngeal tuberculosis excepting, however, absolute voice rest.

Dr. Louis Daily, Houston, Tex.—In the Hajek Clinic in Vienna, Wessely suspends the larynx and exposes the diseased part to a narrow ray, emanating from an arc light, with specially prepared carbons. I had the opportunity of seeing numbers of cases treated in this manner in 1923, and the results were excellent. Ulcers of the larynx cleared up very rapidly, and advanced cases of laryngeal tuberculosis were apparently well in several months. The first publication on this work appeared last year in the *Monatschrift*. In cauterizing the larynx we use the direct method almost altogether. It is very simple with the direct method to cauterize any part of the larynx, except the under surface of the epiglottis. If it is infiltrated it is very difficult to raise the epiglottis sufficiently to expose its under surface.

Dr. Spencer (closing)—Many people who have tuberculosis do not get well, but many can get well. The thing we regret in doing this work is that frequently physicians wait until the patient has unmistakable evidences of laryngeal tuberculosis before they make a diagnosis, and then very little can be done.

Prophylaxis is being carried out more and more. We are not seeing as many cases of tuberculosis as we did ten or fifteen years ago, and if these are diagnosed early they can be cured. They will not need to go West.

I had hoped that Dr. Chapman would tell us more about heliotherapy. He and his associates are using the solar laryngoscope. Dr. Chapman has perfected an auroscope for heliotherapy of tuberculous ears. Do not forget that when you are using heliotherapy the sun's rays applied to the feet of the patient will be of benefit. Expose as much of the body as you can from time to time to the sun's rays, with the patient out in the open air.

Do not forget the danger of tonsil operations in tuberculous patients. Many times they are pushed into the grave by any operation. They are not good subjects for any kind of surgery, and especially tonsil surgery.

Primary laryngeal tuberculosis probably does not exist. Sir St. Clair Thomson believes where a diagnosis is made of primary laryngeal tuberculosis it means that our diagnostic methods are inadequate to detect early lesions in the lungs. My chief, Dr. Levy, Dr. Hill Hastings, Dr. Arrowsmith, and many others who have had ex-

tensive experience with laryngeal tuberculosis have never seen a case. I have never seen a case.

Dr. Briggs (closing)—I would make three or four punctures on either side if I used this method, though not enough to cause reaction. Unless the infiltrated portion is getting worse I would not use the cautery.

There is nothing that will do the tuberculoma as much good as the cautery.

Dr. Greene (closing)—Silence is a valuable aid in the treatment of the early stages of laryngeal tuberculosis, but can not be depended upon in the more advanced stages of the disease. The great advantage of the electro-cautery is that patients can be allowed to return to the use of the voice when fibrosis has taken place.

Dr. LaRue (closing)—I would like to read a letter from Sir St. Clair Thomson, of London. He says: "There can be no doubt that, with the exception of tuberculous meningitis, tuberculosis of the larynx is the most serious manifestation of the tubercle bacillus. It is serious because its very presence shows that the pulmonary infection is either of an acute nature, or that the resistance of the sufferer is extremely low.

"My statistics show that 70 per cent of patients who manifest tubercle in the larynx are dead within a few years, even amongst those in whom the laryngeal lesion has been cicatrized. It is well worth while trying to cure the larynx, as voice use adds to the happiness of life and enables many patients to gain a livelihood or, at least, to communicate with their friends. Of all laryngeal cases I have succeeded in securing complete healing in 25 per cent. Proof of all this you will find demonstrated in greater extent in the brochure which I am posting you.

"In conclusion tuberculosis in the larynx is still an indication of a very serious disease, but the outlook is not nearly so hopeless as it was last century."

INFANTILE DIARRHEA*

By WILBURT C. DAVISON, M.D.,†
Durham, N. C.

It was originally decided that I was to hold a clinic but the physicians of Memphis are to be congratulated, for they have taken such excellent care of the infants here that it has been impossible to find a case of diarrhea.

Diarrhea is known under a number of names: summer diarrhea, cholera infantum, colitis, infectious diarrhea, fermentative diarrhea, gastro-intestinal indigestion, et cetera. In 1904, as the result of the work of two third year medical students, C. W. Duval and V. H. Bassett[1], and of Dr. Simon Flexner and the Rockefeller Commission[2], it was possible to divide diarrhea into two different groups. These students cultured the stools of a large number of children suffering from diarrhea. From a certain number they isolated the bacillus of dysentery, thus definitely establishing a group of known etiology or bacillary dysentery and separating it from another group of unknown etiology which consists of all the other types of increased peristalsis in infants.

Bacillary dysentery is very easily diagnosed[3]. The onset is striking: it is sudden in eighty per cent of the cases. An example of the history which is usually obtained from a patient's mother is:

"At 6 o'clock Monday, when she gave the baby his bottle, nothing was wrong. At 10 o'clock the infant refused to take his feeding and he apparently had fever. She persisted in trying to feed him, but after two or three mouthfuls he vomited. Four or five hours later the mother noticed that instead of his usual one stool a day the child had two or three stools during the afternoon. The loss of appetite persisted and the number of stools rapidly increased so that by the end of the third day the child was having ten to thirty stools daily."

The stools in bacillary dysentery are very characteristic: they are small, about a tablespoonful usually, accompanied by marked tenesmus and pain, and after the second day they contain blood and pus. In some cases there are convulsions at the onset and the infants may either be very irritable or very drowsy. The physical examination is of very little assistance. Signs of dehydration are present as one would expect from the loss of water from the bowel. The average white count is 13,000 but this slight increase may well be due to the dehydration rather than a true leukocytosis; children who have dysentery without dehydration may have a leukopenia, as in typhoid fever.

Among hospital patients, about 20 per cent die in the first twelve days, but in private practice the mortality is lower. Seventy per cent have a normal temperature by the sixth day and their stools become normal about the fourteenth day. About 5 per cent die during convalescence as a result of pneumonia and other complications. Convalescence is usually prolonged because the loss of appetite which characterizes it persists six or seven weeks. Feeding these children is often difficult and they gain weight very slowly.

About eighty per cent of the cases of diarrhea in infants in which the onset is sudden can usually be proved bacteriologically to be bacillary dysentery. If cultures of the stools of the patients are made within two hours after they have been passed, *B. dysenteriae* (Flexner) can be isolated in about 70 per cent and the Shiga bacillus in 10 per cent. If the stools are several hours old, the percentage of positive stool

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†Duke University School of Medicine.

cultures is much lower. In addition to the stool cultures these cases can be proved to be bacillary dysentery by agglutination reactions. These reactions are usually worthless, however, unless the five different strains of the Flexner bacillus and the one Shiga strain are used as antigens[4].

The pathological changes in the intestines of the children who die vary from hyperemia and slight inflammation of the mucous lining to the formation of a definite pseudomembrane[3]. The length of the illness is not an important factor in determining the type of lesion except that in the patients who die during convalescence ulceration of the intestines is more common. The central nervous system changes described in the Shiga type of infection are extremely rare in children.

Unlike the diarrhea of known etiology, or bacillary dysentery, the diarrhea of unknown etiology is not a clinical entity. Possibly in the future this motley group may be subdivided into several varieties but at present there is no satisfactory basis for differentiation. Fermentative diarrhea is the term most commonly applied to these cases, but I shall use the term, ordinary diarrhea, to distinguish them from bacillary dysentery. The usual history is that during hot weather, after improper feeding, or following some febrile, parenteral infection such as otitis media or mastoid disease, the number of stools has gradually become increased. This gradual onset is in marked contrast to the usual sudden onset of bacillary dysentery. The stools are large in amount, watery and loose. They contain no blood or pus, but mucus, which is frequently difficult to distinguish from pus, is often present. Pain and tenesmus are usually absent. These children usually have no fever except from dehydration or a parenteral infection. Sydenham, who used the term "looseness" for ordinary diarrhea, wrote in 1669 the following differential description of bacillary dysentery and ordinary diarrhea, which has not been improved upon, though it has practically been forgotten[5]:

"Dysentery differs from a looseness by being attended with more violent gripings, and the discharge of bloody, purulent, putrid and extremely fetid matters; whereas what is voided in a looseness is either serous, slimy, or bilious, but never bloody."

There are numerous theories which have been advanced to explain the causation of ordinary diarrhea[6]. Various bacteria such as *B. welchi, B. coli,* Morgan's bacillus and a putrefactive or fermentative flora, have been held to be responsible for ordinary diarrhea, but bacteriologists who have examined the stools of normal children have found these same organisms just as frequently as in the stools of children who were suffering from diarrhea[6 7]. Furthermore, the children who die of ordinary diarrhea have no evidence of intestinal inflammation, as would be expected if the condition were caused by bacterial infection, as for example, in bacillary dysentery and typhoid fever. According to another theory ordinary diarrhea is due to the absence of *B. acidophilus*. However, this organism is as frequently absent from the stools of normal infants as it is from those of diarrheal patients. The following theory, namely, that of duodenal infection, is at least plausible[8].

Moro[9] demonstrated that children who die of ordinary diarrhea have duodenal contents which are heavily infected with *B. coli,* whereas the duodenal contents of children who die of other conditions are practically sterile. Whether this duodenal infection is the cause or the result of diarrhea has not as yet been definitely proven but if the end-products of the growth of *B. coli* are fed to dogs through a duodenal tube diarrhea can be produced[10]. It is sometimes assumed that this duodenal infection is due to organisms entering through the mouth, but in the diets which are fed to infants, usually boiled milk or butter milk, it is almost impossible for large numbers of *B. coli* to reach the duodenum by way of the mouth or stomach. It is more likely that they ascend from the cecum and large intestine. This migration of bacteria into the duodenum might possibly be explained on the basis of some primary physiologic disturbance which causes an accumulation of undigested food in the upper intestine and there provides a medium for the growth of these organisms. As a matter of fact, at autopsy the duodenum of an infant who has died of diarrhea contains a large amount of undigested food whereas that of a patient who has succumbed to some other condition is practically empty.

In order to learn whether there was any primary physiologic disturbance which could explain this accumulation of undigested food and the presence of *B. coli* in the duodenum, the duodenal contents were collected from a number of children suffering from various conditions[8]. In the duodenal contents of normal children there was a large amount of enzymes (trypsin and amylase); in those of infants who had ordinary diarrhea there were practically no enzymes, while in those of patients who had dysentery the enzyme content was almost normal. From an examination of the duodenal

contents before and after fever it was learned that almost any febrile disease could decrease the enzyme secretion. From these studies it was concluded that diarrhea of unknown origin, or ordinary diarrhea, probably depended upon several factors. First, a primary condition, such as fever, infection, overfeeding or external heat (hot weather) causes a decreased duodenal enzyme secretion; undigested and unabsorbed food then accumulates in the duodenum; organisms from the cecum and large intestine invade the duodenum and ferment this food material and finally the irritating end-products of bacterial growth accelerate peristalsis and produce diarrhea. In other words, ordinary diarrhea may be due to the accumulation of food and the growth of bacteria in the duodenum instead of in the normal location in the large intestine. A very good statement of this theory was made by James Jackson in 1812[11]. He attributed

"the chemical changes which take place in the contents of the stomach and bowels of children dying of diarrhea to the putrefaction of animal food and the acetous fermentation of that which is vegetable."

For therapeutic reasons it is important to differentiate between ordinary diarrhea and dysentery. For example, the importance of parenteral infections and especially disease of the mastoid have been emphasized as etiological factors in ordinary diarrhea and if the presence of such an infection can be demonstrated the establishment of mastoid drainage may be a life saving operation. However, there is no more excuse for doing a mastoid operation on a child who is suffering from dysentery, a disease in which the cause is known to be intestinal infection, than there is in removing tonsils for typhoid fever. Bacillary dysentery is bad enough in itself without the additional insult of a mastoid operation.

Specific treatment for dysentery in children has so far been valueless. The use of dysentery vaccines, protein therapy, large amounts of dysentery serum intramuscularly and subcutaneously[12] and the feeding and injection of the so-called bacteriophage[13] have not reduced the mortality. The action of the bacteriophage is an extremely interesting phenomenon. A small amount of fecal filtrate added to a culture of dysentery bacilli will cause the culture to be dissolved after two to ten hours of incubation. This dissolved culture, when added to other cultures of *B. dysenteriae,* will cause them in turn to dissolve. This reaction, which works well in a test-tube[14], apparently does not function in the intestinal canal, for as much as 1300 c.c. of this bacteriolytic substance have been fed to children who had dysentery without any appreciable effect[13].

The most important feature in the treatment of dysentery or of ordinary diarrhea is the combatting of the dehydration by the giving of fluid[15]. The fluid can be introduced by mouth, intraperitoneally, subcutaneously, intravenously and by rectum. The last is the least efficacious, for infants, especially those suffering from diarrhea, retain rectal fluids poorly. Blood transfusions are probably more beneficial than anything else in the treatment of both dysentery and ordinary diarrhea. Tests should be performed to determine whether the blood from the donor "matches" that of the patient. The amount of blood given in a transfusion, or of any fluid administered intravenously, should usually not exceed 10 c.c. per pound of the patient's body weight. The citrate method of blood transfusion is simpler and quite as satisfactory as the whole blood method. Except for paregoric, which enables the children who have painful stools to obtain a certain amount of rest, drugs have had very little influence. Diet is of secondary importance to the introduction of fluid. Acid milk with a high protein content, such as protein milk, is beneficial. Lactic acid milk and buttermilk are also valuable. The administration of dried enzymes has not as yet been proved to be of benefit. In children suffering from ordinary diarrhea, sources of infection should be sought and treated.

The prevention of ordinary diarrhea and dysentery is of extreme importance. The number of cases is decreasing each year, due probably to the wider dissemination of knowledge of infant feeding and to the decrease in the number of flies. During the war it was demonstrated that bacillary dysentery in troops was often spread by flies[16]. A fly can cover eight miles in a day[17] and is an important factor in carrying dysentery bacilli from infected stools. Dysentery in adults is usually a very mild disease and as it frequently is not recognized, these cases are a menace to the infants in a household. The subcutaneous injection of dysentery vaccines will prevent the spread of dysentery but the reactions produced are rather painful[18]. It is conceivable that immunity to dysentery can be produced by giving dysentery vaccines by mouth but the results so far have not been hopeful[19].

In spite of the decrease in the number of cases of dysentery and ordinary diarrhea they are still more common than is usually believed. In Baltimore during the summer of 1925 Lawson

Wilkins kept careful records of 628 infants[20]. Sixty per cent remained well; 27 per cent developed ordinary diarrhea and 13 per cent developed bacillary dysentery. The large amounts of money spent in the prevention of diphtheria, smallpox, typhoid fever and scarlet fever are in marked contrast to the lack of money and effort devoted to the control of bacillary dysentery, yet in most cities bacillary dysentery kills more children than all the infectious diseases put together. This disease should be recognized more often and steps should be taken to reduce its incidence.

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SURGICAL TREATMENT OF CHRONIC MASTITIS*

By GUY AUD, M.D., F.A.C.S.,
Louisville Ky.

The purpose of this paper is to direct attention to the differences of opinion still existing between surgeons, clinicians and pathologists regarding some of the fundamental factors involved in the condition we know as chronic mastitis. The rich but chaotic terminology of diseases of the mammary gland is not duplicated in any other portion of the human body. It is responsible for much of the confusion concerning the pathology and clinical significance of chronic mastitis, and has greatly impeded the progress of our efforts to give each individual patient that form of treatment best suited to the condition present.

An examination of the literature by MacCarty[1] revealed that there are at least one hundred and forty-seven different terms which are utilized to express pathologic mammary conditions. Deaver and McFarland[2], in their treatise on the breast, give twenty-three names for the disease which Billroth and Koenig described as "mastitis cystica chronica." An analysis of the terminology given shows many different terms to have been applied to the same condition, or to different stages of the same process, also that at least three theories of the nature of the disease are considered, namely: (a) that it is an inflammatory disturbance; (b) that it is a neoplastic process; (c) that it is a perversion of involution.

At present it is almost universally conceded that the fundamental factor in chronic mastitis is hyperplasia rather than involution. Aside from the fact that lymphocytic infiltration is usually present in chronic mastitis, all efforts to prove it of inflammatory origin have failed. Although

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the epithelial hyperplasia may, at times, suggest a neoplastic process, there is no tumor.

The classifications of chronic mastitis are numerous and very different. The authorities do not agree upon the character of many of the apparently simple lesions of the breast. By some they are described as benign, by others as precancerous, and by still others as malignant. Again, we find among these classifications many conditions which have no place in the terminology of chronic mastitis, such as the diffuse hypertrophy sometimes seen in young women, the encapsulated adenomata, and a number of other lesions of definite infective and traumatic origin.

There is today no generally accepted classification of the disease. That of Bloodgood[2] is especially valuable from a clinicopathological standpoint, being based upon a study of a large series of cases that have been carefully followed for a number of years. He divides chronic mastitis into eight types, the first of which is the blue-domed cyst considered by him the most common, the next two include the other larger cysts in chronic cystic mastitis, and the remaining five types the various forms of chronic cystic mastitis without large cysts. His eighth or last type is that of diffuse non-encapsulated cystic adenoma, known as Schimmelbusch's or Reclus' disease, or senile parenchymatous hypertrophy (Bloodgood).

MacCarty[1] states that we have three distinct histologic pictures in chronic mastitis; primary, secondary and tertiary epithelial hyperplasia. The primary epithelial hyperplasia is characteristic of all chronic mastitis, and is a recognized benign condition. The tertiary epithelial hyperplasia is the recognized picture of carcinoma. The secondary epithelial hyperplasia, he says, represents a precancerous histological picture and, with our present knowledge, its clinical significance is still undetermined.

Practically nothing is known regarding the etiology of chronic mastitis. Koenig, who gave to the process its name, as well as other early investigators of the subject, thought it to be of inflammatory origin, as the name implies. Some believe it to be a response of the gland to irritation arising within the gland itself. Geoffrey Keynes[4] believes the source of the irritation to be the toxic products of accumulated secretion and epithelial debris as the result of a disorderly process of secretion and absorption which is going on at all times in varying degrees in a gland unprovided with an outlet except during lactation. Others believe the source of irritation to arise in a distant portion of the body.

Miller[5] states that not only is pelvic disease very frequently the cause of chronic cystic mastitis, in young women particularly, but also that often the mammary lesions disappear, with no local treatment, if the pelvic pathological condition is identified and corrected. Bloodgood[6] says:

> "This pathological process impresses me as a reaction to some irritant. Microscopically and in addition to the parenchymatous changes, there is evidence of reaction in the stroma of the breast."

Trauma has not been proven to be an etiological factor of importance.

There is hardly any more accord among the authorities on the pathology of chronic mastitis than on any other phase of the subject. Reclus and Schimmelbusch[7] believed that the cyst formation and the cyst degeneration, or the increase in the cellular elements, were the pathologic basis of the disease. Warren[8] believes the process to be one of abnormal involution, and that the changes are cystic and proliferative. Rodman[9] says the predominant alteration in structure is an increase in fibrous tissue, which results in compression of the acini and ducts. Deaver and McFarland[2] prefer the name "involution" as that which most clearly expresses the origin and nature of the process.

Sir Lenthel Cheatle[10] never uses the term "chronic mastitis." He considers the process as either a local or diffuse hyperplasia of the breast tissues, respectively, and that when one is confronted by a condition now imagined to be one of "chronic mastitis," one is in the presence of intricate problems of hyperplasia.

Cysts, while not essential to the development of chronic mastitis, are usually present, particularly in the later stages of the disease, and may vary from one millimeter or less to several centimeters in diameter. They may be single or multiple, uniformly disseminated, or collected in groups. They usually have smooth walls and clear serous contents.

Chronic mastitis is not a disease of one age or sex but is found in its different forms in both sexes at all ages. It is a far more common disease than many of us would suspect. Patients presented for treatment are usually suffering from the more severe forms of the disease. The vast majority of patients, those who have the disease in its earlier stages, are not seen.

Occasionally the breasts in a newborn child are noticed to be enlarged and tender. Keynes[4]

believes this activity of the breasts is probably due to the exposure of the infant before birth to the same hormonic stimulation which, in the maternal circulation, is tending to produce normal lactation. Between infancy and the onset of sexual maturity the breasts rarely ever show signs of activity. The tender and occasionally enlarged breasts occurring in girls, and much more rarely in boys, about the age of puberty, are undergoing physiological changes and seldom require treatment.

Acute mastitis has not been shown to be a predisposing cause of chronic mastitis. The acute lesion occurs practically always during the period of lactation; whereas, chronic mastitis is not restricted to any period of life or condition.

A majority of cases occur in married women following the period of greatest glandular activity. After the age of thirty years the incidence of chronic mastitis rises rapidly, reaching its maximum during the fourth decade. In a series of 406 cases of simple chronic mastitis reported by MacCarty[11] the average age was forty years. Only 22 per cent of the patients were unmarried. Of 207 cases described by Judd[7], 46.3 per cent occurred between forty and fifty years of age.

MacFarland[12] reports an interesting study of tissue taken at necropsy from breasts seemingly normal, and from the bodies of individuals who had not complained of mammary symptoms during life. He showed the presence of residual lactation acini in 15.33 per cent of the 150 mammary glands examined. Among these 150 cases there were 61 per cent in which the women were known to have been married or to have had children, and in these the residual lactation cysts occurred in 25 per cent.

Despite the belief held by many that chronic mastitis is more common in the unmarried, statistics show about two-thirds of the cases to be in married women and women whose mammary glands have lactated. The disease occurs several years earlier, on an average, in the unmarried.

The differential diagnosis between a localized chronic mastitis and an early carcinoma may occasionally be extremely difficult, or even impossible, based upon clinical evidence alone. It should be borne in mind that the early change is microscopic, and that carcinoma occurs in a wide range of ages though relatively rarely before the third decade. The fact that a lesion of the breast has existed for many years, during which time it has remained quiescent, is no assurance that it may not become malignant at any time.

Chronic mastitis is most often seen in women approaching the menopause. The patient usually complains of an aching or dragging sensation in one or both breasts. Sometimes it will be described as a soreness or sensitiveness of the breast, and again as a "pricking" pain. The pain and discomfort depend largely upon the size of the lesion and the density of the surrounding stroma. The pain is confined to the breast itself, and is quite different from the radiating pains accompanying cancer.

The symptoms are nearly always increased at the menstrual periods. There may be an intermittent discharge of fluid from the nipple, and in patients with intraductal papillomata the discharge may be bloody. The axillary lymph glands may be palpable and tender, but they remain soft and are usually discrete; whereas, in cancer they are generally hard and tend to become matted together. If the patient be fleshy, or the mammary glands unusually large, great difficulty may be encountered in diagnosing deeply situated lesions. They may usually be located by elevating the breast and gently palpating it between the fingers. The nodules in chronic mastitis are generally multiple and may be moved freely in the breast tissue. The breast does not become attached to the fascia of the muscle or to the skin as in cancer. Infiltration of the surrounding tissues is significant of carcinoma.

Sistrunk[14] states that 5.5 per cent of mammary lesions diagnosed malignant at the Mayo Clinic prove to be benign, and that 11.2 per cent of those diagnosed benign prove to be malignant.

By careful clinical examination we can make an accurate diagnosis of chronic mastitis in a large percentage of cases, but we cannot determine definitely that the lesion is not associated with an early malignancy.

There is no question of greater interest and more vital importance in breast pathology than the relationship of chronic mastitis and carcinoma. It is most probable that areas of definite chronic mastitis are present in some portion of the mammary glands of every adult female, particularly in those past thirty years of age whose breasts have lactated.

While it seems to be almost universally agreed that the epithelial changes of chronic mastitis precede carcinoma of the breast, there is no accepted scientific proof of the change. The fact that chronic mastitis is frequently associated

with mammary carcinoma does not mean that it is the forerunner of cancer in any large percentage of cases.

Keynes[4] does not believe that chronic mastitis is a precancerous condition in a majority of patients in whom it occurs. Bloodgood[15] states that his records of mammary carcinoma do not show a single instance in which malignancy has developed in a woman both of whose breasts were the seat of diffuse mastitis. He says:

> "My conclusions are that chronic cystic mastitis is not a lesion of the breast which at present may be considered precancerous, and its presence does not demand either the complete excision of the breast or the complete operation for cancer."

MacFarland[13] considers residual lactation acini to be harmless decadent structures having no significance in respect to the subsequent appearance of cancer. MacCarty[11] found the association of malignancy with chronic mastitis to be constant in 967 cases of mammary carcinomata. Ewing[16] finds that a very large proportion of mammary cancers occur in breasts which are the seat of chronic mastitis; and, of his own material, about 50 per cent of breasts excised for cystic disease show pronounced precancerous changes or miniature carcinomas. Abell and Graves[17] state that in their study of a series of cases of mammary carcinoma with a history of long duration of symptoms, from three to ten years, it is clear that a vast majority, if not all, were superimposed on benign disease.

Of the published reports of the results following operations for chronic mastitis, when the entire breast was not removed, in very few instances has it been found that cancer developed later. Bloodgood[3] reports 128 such cases in which carcinoma later developed in three, or about 2 per cent, which he states is apparently not more frequent than the normal incidence of cancer in the same number of women at the same age who had not been operated upon. In a recent series of 71 patients subjected to operation by Abell[18], one of which was a male, 56 are reported upon, and none has developed cancer.

Chronic mastitis in itself is a benign disease and would not require surgical treatment except for its relationship with cancer and for the relief of pain. True tumors frequently occur in breasts that are the seat of chronic mastitis. Such a tumor should be regarded as malignant until it has been proven innocent.

An early carcinoma may so resemble a fibroadenoma clinically as to deceive the most experienced clinician. MacCarty[9] says that one in every five patients with pathological breasts may be saved from radical operation if the surgeon is accompanied in his work by a competent surgical pathologist.

Our present knowledge of chronic mastitis does not permit the application of fixed rules to the treatment of the disease in its various stages. However, there are some general principles which will greatly aid in selecting for surgical treatment only those cases requiring operation.

Operation is seldom necessary in individuals under twenty years of age, especially if there are multiple nodules present, unless a recent change has occurred in some one of the nodules, and then it should be excised for microscopic examination before performing a radical operation. Single nodules, in women under twenty years of age, that show recent change or produce marked sensory disturbance, should likewise be removed.

After the age of twenty-five, all single nodules of the female breast should be excised. Occasionally it may become necessary to remove a localized area of mastitis because cysts have formed which produce a tumor suggestive of malignancy. In such cases excision of the entire breast is much preferred, as the lesion is apt to recur in other areas of the breast from a diffuse mastitis existing at the time of removal.

The earlier stages of chronic mastitis seldom require operation, particularly in young women; nor do the cases in which the pain and discomfort occurring at the menstrual periods are the chief symptoms. In such cases the disease usually subsides of itself or is relieved by the onset of lactation.

In women approaching the menopause, who have doubtful mammary lesions, it is safer to excise the entire breast for immediate examination. In young patients with such lesions wide excision of the affected portion of the breast for examination is usually sufficient.

A "lump" in the breast of a pregnant woman is much more dangerous, because of the increased glandular activity at that time, particularly if it is not known to have existed prior to the pregnancy. In such cases the "lump" should be removed about the fifth month of gestation when possible.

The type of chronic mastitis known as Schimmelbusch's or Reclus disease, being diffuse and occurring most commonly in individuals between thirty-five and fifty years of age, is best treated by removal of the entire breast.

No operation for a supposedly benign mam-

mary lesion should be undertaken unless the surgeon is prepared to perform the radical operation for cancer.

SUMMARY

There is little uniformity of opinion regarding the clinical significance of chronic mastitis and the pathological processes involved in the various stages of the disease. The nomenclature is unsatisfactory, including different terms for the same process, and others that have no place in the terminology of the disease.

There is no generally accepted classification of chronic mastitis. The same pathological picture is described by some as benign, by some as precancerous, and by others as definitely malignant.

Chronic mastitis is far more prevalent than many of us believe it to be. The majority of patients, who have the disease in its earlier stages, are not seen. The incidence of the disease rises rapidly after thirty years of age, and reaches its maximum in the fourth decade. Almost two-thirds of the cases coming to operation are in married women.

There is no accepted scientific proof that chronic mastitis undergoes malignant change, although it is present in a large percentage of breasts removed for carcinoma.

Operative treatment for chronic mastitis is seldom indicated in individuals under the age of twenty years. After twenty-five years of age all single nodules of the breast should be removed. In patients past thirty-five years of age, with suspicious mammary lesions, it is safer to excise the entire breast for immediate examination. In patients under the age of thirty-five years, with suspicious mammary lesions, wide excision of the diseased portion of the breast is usually sufficient. Immediate examination of the tissue removed will determine whether more radical operative procedures are necessary.

CONCLUSIONS

Many of the fundamental factors regarding chronic mastitis are still not clearly understood, The resulting confusion is responsible for much of the unsatisfactory results in the surgical treatment of the disease, and no doubt leads to unnecessary sacrifice of many breasts and the unwarranted mutilation of many others. We cannot hope for any marked improvement in the treatment of chronic mastitis so long as this state of affairs continues.

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Francis Building.

DISCUSSION—(*Abstract*)

Dr. Irvin Abell, Louisville, Ky.—Dr. Aud has presented a most interesting discussion of chronic mastitis stressing the points in which, after years of rich experience and observation, unanimity of opinion is still lacking. In reviewing the literature of chronic mastitis one is forcibly reminded of the early papers on ureteritis, pyelitis, pyelonephritis, pyonephrosis, each being regarded as a separate entity and not as a stage of the same infective process. The analogy is not complete in that chronic mastitis is not an infective process, yet a correlation of the writings dealing with it would indicate a similar development of thought, the views expressed being largely influenced by the stage of the disease studied by the individual writer. The pathology as revealed by the microscope consists of an infiltration of the stroma with lymphocytes and plasma cells with a coincident hyperplasia of the epithelium lining the acini with or without the development of cysts. Such a pathological picture would indicate a reaction to an irritant rather than the sequence of an infection, or the course of an involution. As it is the most frequently observed lesion in the breast the importance of a correct clinical interpretation is obvious. A review of the pathological reports in hospital files of today will disclose the fact that at times breasts are needlessly removed, as well as the fact that at times opportunity for cure is denied by incomplete operation as a result of errors in such interpretation. As the essayist said, the recognition of

the diffuse and the bilateral types of chronic mastitis does not offer much difficulty, while the differential diagnosis between a localized chronic mastitis and an early carcinoma may be extremely difficult or even impossible based upon clinical evidence alone.

It is to the latter phase of the disease, the localized chronic mastitis that I wish to devote the remainder of the time at my disposal, considering it from a pathological viewpoint as a possible starting place for cancer and from a standpoint of results following local resection or excision.

Dr. Aud has quoted the opinions of a number of observers on the relationship of chronic mastitis and carcinoma, and here as elsewhere in his review of the subject finds a wide diversity. From my own observation and study I am convinced that such a relationship definitely exists, particularly as regards the localized form of chronic mastitis. In the histories of the breast cancers in our files the statement of patients repeatedly occurs that palpable nodules had existed for periods ranging from three to ten years before the onset of the rapid growth which led them to seek surgical advice. It is conceded that some of these may have been and were simple neoplasms and at the same time it is my firm belief that a definite percentage of such nodules represented a localized mastitis.

The epithelial hyperplasia that occurs with chronic mastitis, in the light of our uncertain knowledge regarding the cause of cancer, is conceivably a favorable field for the transition from the limited hyperplasia of the former to the unlimited hyperplasia of the latter. It has been our practice to excise or resect local chronic mastitis when the palpable mass remains stationary or increases in size, indicating a fixed tissue change.

In a paper before this Association in 1921, 78 such cases were reported of which 62 were traced and 5, or 8 per cent, were found to have a recurrence or extension of the disease. In 71 cases operated upon since 1921, 56 have been traced and 10, or 18 per cent, have either pain or a localized hardness indicative of further disease. None of the 118 patients traced has developed cancer and a few have gone through subsequent pregnancies with normal lactation.

Aside from any cosmetic reason the importance of preserving the breast when the patient is in the childbearing age is apparent even though in the light of our present knowledge of chronic mastitis we realize that following such resections, the disease will in a certain percentage of cases appear in other parts of it, or in the opposite breast.

Dr. Robert L. Sanders, Memphis, Tenn.—Dr. Aud has made an extensive study of the literature regarding the chaotic condition of the present opinions, both from the clinical and the pathological standpoints. If twenty-three different names are applied to the condition which he calls chronic cystic mastitis, or chronic mastitis, it is no wonder that we are at variance in discussing it.

We have had 65 cases that were regarded as chronic cystic mastitis, of the more or less diffuse type. I am not speaking of the single nodule but of the multiple cysts, and so far we have not had a single case of the development of carcinoma of the breast, but we have had the following condition, namely: when a local cyst has been removed, after months or years other cysts have occurred, making a second resection necessary, and in one instance it has been necessary to go back the third time and operate upon the breast. Since most of these cases occur in women approaching the menopause, or in women who have borne children, the treatment should be excision of the breast. The type of excision of the breast I think has not been mentioned, but for cosmetic purposes the Warren procedure, leaving the breast portion and preserving the nipple, makes a splendid operation. I think that possibly the best thing to do is the local amputation of the Warren type.

Dr. Aud mentioned that the pain was nearly always local, in the breast itself and not of the radiating type that occurs in carcinoma. That has been our observation also, and is the thing that has led to operation in most instances. Patients complain of severe pain in many of these cases, and it frequently is bilateral. It may be a real problem to know what to do for this pain. A bilateral amputation is often unwise.

USE OF AMMONIUM CHLORID AND NOVASUROL IN THE TREATMENT OF EDEMA*

By W. C. Blake, M.D., F.A.C.P.,
Tampa, Fla.

Edema often presents itself as a troublesome or serious complication in quite a number of pathologic conditions. The study of the mechanism of its formation and the means of combating it have always been an important and interesting study. No attempt has been made to give this paper the character of a complete study or review. The experimental data cited have been appropriated largely from various investigations and are used here only to offer a practical explanation of the use of the newer diuretics, ammonium chlorid and novasurol, the use of which in the treatment of edema constitutes one of the outstanding therapeutic achievements of the past few years.

The physiology of the elimination of urine in health is complicated and incompletely understood. Still less is it understood in conditions presenting edema as a prominent symptom. Edema is always a resultant condition. It is a symptom superimposed on one of several types of underlying pathology, and, although only a symptom, it is often important enough to demand attention even before serious consideration can be given to the primary condition. In combating edema diuretic drugs have always been in demand in aiding the eliminative processes of the body, and the intricate manner of their action has been a fascinating study with many ramifications.

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If we would augment the fluid output of the body, we must first turn our attention to the amount and character of the intake. The so-called salt-free diet with limited fluid intake has proven its value and is well established in the treatment of all types of edema. Sometimes its institution alone accomplishes a satisfactory therapeutic effect, but at other times further measures must be employed. However, the institution of a salt-free diet with a limited fluid intake should be considered a necessary preliminary to any further therapeutic effect. The actual salt content of the diet need not be as low as some would have it. Any diet with a relatively low protein content, and prepared without the addition of sodium chlorid as a seasoning, is usually satisfactory. Various articles of diet may often be allowed to meet special requirements or the wishes of the patient. A fluid intake of 1,000 to 1,200 c.c. during twenty-four hours should only exceptionally be exceeded. The use of distilled water is of some advantage.

The use of acid-forming salts as diuretics dates back to 1917 to the demonstration by Meyer and Schultz that calcium chlorid produced diuresis in cases of nephritis with edema. Since then other salts have been used with the same effect. More recently ammonium chlorid has largely replaced them, due, in part, to the somewhat greater ease of its administration and because of its superiority as a diuretic. The ammonium radical is rapidly liberated and synthesized to urea, which in itself is a diuretic. The chlorid is retained as hydrochloric acid, changing the acid-base equilibrium and producing a mild chlorid acidosis. The relative and absolute amount of chlorid and sodium, together with other fixed base, is increased in the urine. This splitting of the salt is known to take place, yet why diuresis follows is not definitely known. Does it affect the renal epithelium or the body tissues in which the edematous fluid is retained? Although this question cannot perhaps be definitely answered, the evidence seems to be in favor of the view that its action is largely extra-renal, changing the physio-chemical balance of the body tissues rather than to any primary renal effect.

It has long been known that certain mercury compounds had a diuretic action, calomel having been used for this purpose nearly half a century ago. Its action on the gastro-intestinal tract, however, curtailed its extensive or continued use. About ten years ago novasurol, as organic mercury compound, was introduced as an antisyphilitic.[1] Its use soon revealed the fact that it produced polyuria. This effect was further investigated and found to be almost constant and has led to its rather extensive use as a diuretic. Investigation of the urine following the administration of novasurol revealed an increased output of water, chlorid and total inorganic base. It would seem at present that diuresis results, largely at least, through its ability to mobilize water and sodium chlorid from the tissues with a resulting hydremia and secondary overflow of these substances into the urine rather than to any secretory action on the kidney. The further chemical studies proceed the broader becomes our conception of edema as an altered chemical balance rather than an inability of the kidneys as secreting and filtering agents.

While ammonium chlorid and novasurol have both become established as diuretics of the first order, their combined use has often produced diuresis to a really remarkable degree. Whether their combined action is due to a summation of effect, or whether one acts as a complement to the other, is not clear. Clinical experience, however, has repeatedly shown that, when one or both have failed singly, their combined use has often resulted in an increased urinary output. In a number of instances in which novasurol has failed, the blood plasma chlorid was found to be much below normal. When this deficiency was overcome by the preliminary administration of ammonium chlorid, novasurol then acted with its usual potency. The mild acidosis produced by ammonium chlorid seems definitely to enhance the action of novasurol and suggests the desirability of first administering this salt.

Ammonium chlorid, like some other of the acid-forming salts, has a very disagreeable taste. It can be only slightly disguised by vehicles. It is not readily soluble, and for our purpose the dose is rather large, averaging 5 to 10 grams in twenty-four hours. Twelve to fifteen grains can be packed into a large capsule by a painstaking druggist, and we have found this to be the most satisfactory manner of administration. Of course, each dose should be followed by a small amount of water. Novasurol may be given intramuscularly or intravenously. The latter method gives the most uniform results. The average dose varies from 0.5 c.c. to 2.0 c.c. It is well usually to give the smaller dose first to detect any hypersensitiveness to the drug. During active catharsis it may cause an acute colitis, so it is important that no cathartic be given on the day the drug is administered.

The most striking therapeutic effects are obtained in cases of edema of cardiac origin. The rate at which the edematous fluid is removed is often surprising, sometimes almost spectacular. It is not unusual for the daily output to increase from 600 to 700 c.c. to three or four litres, or even more. This soon relieves the strained heart of an embarrassing impediment and the salutary effects are readily appreciated by the patient. It is good practice in these cases to begin relief measures with a large dose of digitalis and two drams of compound jalap powder. This is followed in two or three hours by an ounce of magnesium sulphate. I am aware that these measures are drastic, but I know of nothing that will afford the patient a greater measure of relief during the first twelve hours of treatment. After active catharsis has ceased, ammonium chlorid is given and is followed a few hours later, preferably during the morning, by novasurol. The ammonium chlorid must be continued for five to ten days and repeated later, if necessary, while novasurol is given every three to five days.

The duration of the period of decomposition and, of course, also the type of lesion have an important bearing on the recuperative power of the heart. The longer the period of decompensation, the greater the damage to the myocardium. I am confident that it is conservative to say that the period of convalescence of these cardiac cases with edema treated as outlined above is reduced by one-half when averaged against the time required by our previous methods. It has not been unusual to see waterlogged patients changed from a state of cyanosis and breathless apprehension to one of comparative ease and comfort after a period of twenty-four to forty-eight hours. Too often, I think, the newer method is reserved for desperate cases. Its circumspect employment has often been a great help to us also in cases of mild and moderate severity.

The advisability of using diuretics in nephritis has been a much discussed problem for a number of years. Novasurol, like other mercury compounds, may act as a kidney irritant. A large part of the drug is excreted through the kidney. Keith and Whelan[2] were able to recover 48 to 85 per cent of the amount administered during the succeeding twenty-four hours. Renal casts are present in all types of edema and are not in themselves a contra-indication to the use of the diuretics under discussion. I have not used novasurol in cases with evidence of marked renal impairment, but have gained the impression that ammonium chlorid has a distinct value in some cases of this class.

Tubular nephritis and nephrosis are often accompanied by a marked degree of edema which in itself aggravates the condition of the kidneys. Diet, elimination of the causative agent so far as possible, and patience have been our first therapeutic measures. Several of our cases of edema from nephrosis have cleared up with the administration of moderately large doses of thyroid extract as suggested by Epstein. When these measures failed us, ammonium chlorid was tried, sometimes with success. In the chronic types of nephritis much depends on the functional capacity of the kidneys, the presence and amount of nitrogen retention, and the degree of edema. When there is marked functional impairment or marked nitrogen retention, the stronger diuretics should generally not be used. However, most of the warnings against their use have been in cases with uremia in which the nitrogen retention would have been apt to increase, regardless of any measure used. Our decision to use diuretics in these severe cases is usually determined by the previous failure of more conservative measures. If improvement is not noticeable after the first administration, they should be discontinued. Certainly a great many chronic nephritics with persistent edema may be readily and advantageously relieved of their edema by ammonium chlorid and novasurol, resulting in a general symptomatic improvement and increased 'phthalein output.

The edema and ascites accompanying hepatic cirrhosis are largely due to mechanical obstruction of the venous return through the portal circulation, and it is obvious that efforts to eliminate the accumulated fluid through the kidney will not relieve the tendency toward reaccumulation. It is also true that after the ascites reaches a certain stage the general circulation is so impeded that further edema ensues. Rountree[3] reported ten cases treated by restricted salt and fluid intake, ammonium chlorid and novasurol. In seven cases the relief of edema was complete, and in three only partial. Snell and Weir[4] have recently reported a further enhancement of the urinary output by the use of euphyllin in conjunction with these drugs. Serby[5] has pointed out that with prolonged, frequent administration of novasurol, damage may be done to the liver and suggests the advisability of following its administration with functional observations.

In my own experience, nine cases of portal cirrhosis have been treated with ammonium chlorid and novasurol. In six there was complete disappearance of ascites and edema; in

three there was no definite improvement. A tendency toward re-accumulation of fluid has been noted. However, the re-accumulation has not been so marked, nor so rapid, as was expected. All have been instructed to take five grams of ammonium chlorid for four days every other week. From one to four injections of novasurol have been required at intervals of two weeks to three months. The improvement in strength and lessened evidence of acquired collateral circulation have been gratifying.

One case of tuberculous peritonitis with ascites has been under observation for a period of three months. The ascetic fluid practically disappeared during the first two weeks of treatment and has so far shown no tendency toward re-accumulation.

The untoward effects and dangers of novasurol seem to have been greatly exaggerated. Mild gingivitis and stomatitis have been very occasional complications occurring usually only after repeated administrations. Enteritis has not been met with in over two hundred injections in our own work. The fact that it has occasionally been noted in the literature suggests the impropriety of giving purgatives the day before, or after its administration. My initial dose has usually been only 0.5 c.c., and so far I have not seen an instance of systemic reaction following its use or after the subsequent larger doses.

CONCLUSION

Ammonium chlorid and novasurol, singly or in combination, have proven to be potent and trustworthy diuretics. They relieve edema in diverse pathologic conditions. They do this often after other measures have failed. The rapidity with which large accumulations of fluid are eliminated is at times remarkable. Probably the most striking results are obtained in cases of edema of cardiac origin. In our opinion the value of ammonium chlorid and novasurol in the treatment of edema should be more generally appreciated.

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DISCUSSION (*Abstract*)

Dr. Thomas P. Sprunt, Baltimore, Md.—The question of the mobilization of fluid in the body is certainly more than a mere matter of the deficiency of the circulation that we are apt to assume particularly in cardiac cases. We have long been accustomed to think of the retention of sodium chlorid and of water in nephritis and to recognize the significance of the changes in the chemistry of the body fluids in such cases. We may forget, however, that in chronic passive congestion physico-chemical changes may also occur. Keith and his coworkers came to the conclusion that the changes brought about by the use of ammonium chlorid and of novasurol were referable chiefly to the general body tissues and not to the kidneys.

There is a clinical condition not associated with edema that may illustrate in a different way this same point. Diabetes insipidus is concerned with a very unusual mobilization of fluid. For some reason the tissues apparently cannot hold fluids as usual. The fluid is excreted by the kidneys in large quantity, eight to ten to twelve quarts a day. There is a corresponding demand for fluid by the tissues and an enormous thirst, with the consumption of great quantities of water. If one administers to such a patient a hypodermic injection of products of the posterior lobe of the pituitary gland the excessive excretion of fluid ceases, the thirst disappears, and for a few hours at least the patient seems entirely normal. The condition of diabetes insipidus can be induced experimentally, and in such animals it has been found that pituitary products have this same effect even when the kidneys have been denervated. The general impression now of students of this disease is that the pituitary product exerts its influence by means of some physico-chemical change brought about in the body tissues and not by any direct effect upon the renal epithelium.

Ammonium chlorid and novasurol we have found most helpful in chronic cases of heart failure in which the edema is often quite resistant to the usual methods of complete rest and cardiotonic therapy. In cases of ascites without general anasarca we have had much less success. We have recognized no definite damage to the kidneys even in cases of hypertensive cardiovascular disease, but have encountered mercurial stomatitis in cases predisposed to it by pyorrhea.

Dr. Henry M. Thomas, Jr., Baltimore, Md.—I wish to ask a question about the use of novasurol. I understood Dr. Blake to say that if no beneficial effects were noticed after the first dose the treatment was discontinued. In certain cases that I saw this summer in the Wenkebach Clinic in Vienna, the diuretic effects were not obtained until after the second, or possibly the third, dose of novasurol. I should like to ask whether Dr. Blake noticed any benefits after the first dose or whether he suggested discontinuing it after the first dose only in renal types of edema.

Dr. E. C. Thrash, Atlanta, Ga.—I visited Dr. Keith about three years ago when he was conducting the cardiovascular clinic with this plan of treatment. I instituted the method immediately in my work in the Municipal Hospital, where the totally disabled patients naturally gravitate.

We often plan to use a remedy empirically and then work for years to learn why it does not accomplish the result.

In my earliest work in medicine I was taught to give ammonium chlorid in pneumonia. We are still

giving it, and I think it is one of the best remedies we have. Probably the chemical behavior of ammonium chlorid has some bearing upon edema just as it has in pneumonia: that is, the chlorid aids in delivering carbon dioxide through the air vesicles outward and in taking care of the sodium in its return to the tissues. Some similar chemical processes may go on in this manner in edema.

Probably more than half of the body cells are endothelial cells. They line all of the hollow and tubular viscera and make up the total content of the capillaries. They serve as the recipient of all foods, changing them and fitting them for utilization in the stomatic cells. They serve as a buffer to protect the body against toxic invasion.

Stasis is the etiological background of edema. The cells on account of the stasis become waterlogged and inefficient and a vicious circle is established. We can easily picture the chlorids aiding in stabilizing the normal metabolism of these cells, and probably novasurol behaves in the same way. The normal physiological process is attained to the highest degree only when endothelial cells are functioning properly.

This remedy, I think, has come to stay. It has its field of usefulness, but we should be very careful of using it in advanced renal disturbances. Trouble will occur if you do not instruct your patient how to live correctly, put him on a proper diet and reduce his weight if he is obese.

Dr. Blake (closing).—I do not think I have seen any marked damage to the kidney from these drugs, although various men have warned against using them in cases of marked renal damage. Of course, in certain types of edema, particularly nephritic edema, where you have coma and an ascending nitrogen content of the blood, giving novasurol will occasionally increase nitrogen retention. Whether it is due to injury to the kidney by novasurol is not certain in all cases, because you are dealing with a patient who is apt to die regardless of what is done.

Dr. Thomas asked if I had advocated stopping the use of these drugs if the first administration was not successful. We should be careful where there is any marked renal damage, and it was only in those cases that I meant to sound a warning not to continue the drug. It should certainly not be used in large doses if there is marked renal damage. It is very true that frequently you get a maximum output after the second or third administration of novasurol.

DIFFERENTIATION OF THE VARIOUS TYPES OF GOITER*

By J. A. CRISLER, M.D.,
Memphis, Tenn.

Much is known about goiter and much remains to be learned. What we know we probably know very well, but we are aware that there is much hidden away that we have to learn later.

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I have been able to secure from my practice three different types of goiter to present to you, the types that are recognized as the colloid, the adenomatous and the exophthalmic. These patients were kind enough to come here so that they could be exhibited as typical examples of these three major groups.

I wish to pay my respects to Plummer, Marine and Kendall, and others who have contributed to the present conception of goiter. What they have taught us about iodin, I wish to bring out this morning. If anything that I tell you is worth while, it will be in reference to the use of iodin or the iodides in goiter. Next to the discovery of insulin, probably the use of iodin in goiter is outstanding. Iodin is the worst abused drug in the medical profession. It has become a very common thing for many physicians to give iodin to every patient with goiter, regardless of the type, regardless of the damage it may do, and tell the patient to take it and report to him—perhaps. I have a patient now who is too sick for surgery and I am afraid she may die before we can even ligate the superior thyroids, and a physician in Memphis has given her Lugol's solution for months. She is nearly dead because she has been over-iodized and improperly treated.

Case 1.—This young lady, who is 20 years old, has a simple, colloid goiter. It is soft, yielding, and not nodular. It is sometimes called the goiter of puberty or adolescence. She has had it for some years. She is not sick, and will not be sick from it, because there are no nodules in it. She has very little chance ever to develop exophthalmic goiter from it, unless an anxiety neurosis, great mental anguish, fright, or something of that sort overtakes her, which might precipitate a very acute hyperthyroidism, which might eventuate in exophthalmic goiter.

This is a case in which five drops of iodin daily for a month is indicated, the dosage to be continued or repeated as determined by observation of the case. It may be treated successfully with iodin without fear of precipitating a hyperthyroidism, without fear of doing her any harm, provided one uses judgment in grading her dosage according to her needs, and keeps her under observation. This is the goiter of young individuals. It usually starts in girls around twelve, sometimes as early as ten. It sometimes disappears at sixteen or seventeen, after the menstrual function has been thoroughly established, but frequently persists until twenty or twenty-two without doing any considerable harm. It has been remarked that the artists who draw pictures of beautiful women almost always give them the neck of a colloid goiter.

Case 2.—This young woman is 22, the mother of a child two and a half years old, who has had the next most common form, the adenomatous, or nodular, bumpy goiter. She has had it to my knowledge for eleven years. She cannot get well of it. There is no treatment on the earth that will do any good, except the removal of it. We see her at least twice a month and are guarding her against the first approach of hyperthyroidism. Her family history is negative. She has never been sick but once, eleven years ago, when she had an acute throat infection that was said to be tonsillitis, but afterward was believed to have been diphtheria.

All of these women have had tonsillitis. Just what connection there is I do not know, but I think there is a very definite connection, for infected tonsils and abscessed teeth will, at times, bring about an overactivity of the thyroid or hyperthyroidism.

These cases have a tendency to become active at almost any time, provided the patient experiences great fright, shock or mental anguish. Kendall, Poole and others use the term "anxiety neurosis." That is a splendid term, but I think mental anguish is a little better. As long as the patient can go along without this she will do well with her adenomatous goiter. Plummer has shown that these cases go along without trouble on an average of fourteen years.

This girl has gone for fourteen years without any form of iodin or iodides. She does not tremble, except perhaps from a little excitement due to being here on exhibition, but if you wish to activate this thyroid, just give the patient Lugol's solution and in four or five weeks you will throw her into violent hyperthyroidism.

Another reason that we should pay more attention to the use of iodin is that almost any good physician who is busy will say to such a young woman who comes along and asks him to look at her neck, "You have a goiter." The patient will say, "I know that," and the physician then says, "Get a bottle of Lugol's solution and take five drops three times a day." That will precipitate a hyperthyroidism that may even be fatal. He never will cure it, for the iodin will not benefit the condition. The time to have given it was before she was born. At the very first appearance of the growth it might have been indicated, for then it looked as if it was a colloid affair, like our first case, but it had the little lumpy areas throughout the substance of the gland, which developed into a palpable adenoma.

I am bringing this out merely to emphasize the fact that I see goiters every day that somebody has overdosed, or unwisely dosed with Lugol's solution. We cannot blame the individual physician for it. He knows just enough about it to know that it is good for goiter. He says to his patient: "Well, let's try Lugol's." He would cure the simple goiter if he gave it properly; he would make the second patient very sick, and in the third case he would take away the only chance she had for recovery. We have no right ever to give iodin to a patient with any form of goiter unless we know exactly which type it is.

Case 3.—This young woman, aged 26, was married at 16, and has one child, who is 6 years old. She had a violent attack of tonsillitis, with a tonsillar abscess, following what was thought to be malaria, last February. She did not know she had a goiter before she developed what you now see. She has the exophthalmos, the Stellwag sign, the Moebius sign, and every other sign. The upper lid will scarcely close at all. She trembles like an aspen leaf and the pulse is about 160. The goiter is not very large, but it is very perceptible.

What happened to her? I wish to bring out the "mental anguish" phase, because it so often converts a simple hyperplastic growth which is not noticeable into a very toxic state. This patient has had a great deal of family trouble. She is separated from her husband, who is suing her for their child. All of her heartstrings have been pulled violently and she has developed this condition. She was treated with iodin over a long series of hospitalizations, but has had no operation. She came to me for operation, but we cannot operate upon a patient with these symptoms and promise her safety. Luckily, she has now dispensed with iodin for a long time and perhaps by giving her large doses for a short period we may be able to bring her pulse down to a safe limit. If not, we shall have to ligate the two superior thyroid arteries, which is not a serious thing at all.

Why should the iodin not have been given? Because it took away the only weapon she had to safeguard her against these preliminary operations and the long hospitalizations. This has been taken away from her now. Her former physician told her to take it and it did her so much good, apparently, that she continued to take it much longer than she should. We shall probably never be able to bring the pulse down to a safe point, but shall have to tie off the two arteries and then remove the exophthalmic goiter later.

Let us remember, please, that iodin is not indicated in goiter of all types. It never has cured any goiter except the simple colloid. You are not justified in giving it to any one with any other type except when you are preparing the patient for operation.

Question.—Have the patients had their tonsils removed?

Dr. Crisler.—All three of these patients had their tonsils removed as quickly as possible after the tonsillitis. The young woman with the exophthalmic goiter did not develop the bad symptoms until she had all of her mental anguish, but she had some toxemia at the time of the tonsillitis. There is some connection there, but I have not time to discuss it now.

THE PLIGHT OF THE DEPENDENT CHILD*

By ROBERT A. STRONG, M.D.,
Pass Christian, Miss.

About seventeen years ago a young mother whose dark and dreadful tragedy has never been discovered, whose very name will never be known, deserted her baby, leaving it on a bench in a park along Main Street, U. S. A. Paradoxical as it may seem, her act brought about the beginning of a movement which has resulted in joy and happiness to hundreds. The mother, regardless of what she may have done, probably would have been considered as having joined the horde of harlots who are malignantly referred to by certain types of ecclesiastic mountebanks, who bear the same relation to the legitimate clergy as chiropractors do to regular medicine, as "painted daughters of Jezebel and bedizened huzzies, who stalk the streets of our fair cities and flaunt their sin in the face of the Lord; who lure our sons and brothers into their vile haunts and ply their nefarious trade," and so on in the usual way while they shake a cadaverously grimy index finger at us and proclaim loudly and incessantly that "our collective morals are compounded of a slice of Sodom and a cut of Gomorrah, with a liberal sprinkling of Babylon."

There is nothing unusual about the story of this Magdalen. More than nineteen hundred years ago Christ handled a similar situation, but He handled it quite differently. The story, after all, is commonplace. The same thing happens so frequently that most of us rarely glance at more than the usual sordid headlines in the newspapers.

What of the baby, the innocent, helpless and dependent victim? But let us go on with the story. As it happened, the baby rolled under the bench and was discovered many hours later, half dead from exposure, by a kindly policeman who took it to a near-by hospital. Fortunately in many ways, an eminent pediatrist was a member of the staff of the hospital and for one or another of those intimate little reasons familiar and irresistible to most of us, this little bit of abandoned humanity especially appealed to him. He put forth a special effort to save it.

Now he was one of those who after years of hospital experience with infants and little children, with varying degrees of success and failure, had reached the very definite conclusion that there were certain nutritional and disease conditions in these little patients that were not amenable to any treatment in any hospital or institution. He believed, as many have been compelled to recognize, that the very structure and operation of the hospital, special and general, include conditions altogether unfavorable to infant life.

Moreover, he appreciated the paramount importance of a peculiar and particular aptitude in nurses to acquire the necessary *savoir faire* to care successfully for delicate and sick infants. Many nurses, in spite of adequate training, never acquire the patience, watchfulness and loving touch which is so necessary. He realized that the constant change by rotation of nurses and interns was an additional factor against him. Then there was the ever-present danger of cross infection which was responsible to no small degree for a certain proportion of the mortality. Finally there was the lack of the necessary urge to live, so naively expressed by that close observer, Jane Addams, of Hull House, who sympathetically puts it as follows:

> "We are told that the will to live is aroused in each baby by his mother's irresistible desire to play with him, the physiologic value of joy that a child is born, and that the high death rate in institutions is increased by the discontented babies whom no one persuades into living."

In other words, there is the lack of the persuasion to live which can be supplied only by a mother or one willing to put forth an earnest effort to take her place.

So realizing that the odds against him were great, and discouraged by the fact that this baby in whom he had become deeply interested failed to gain, he took it home to his wife. Combining motherly devotion with an expert knowledge of scientific infant care, she accomplished in one week what he failed to achieve in a much longer time with the assistance of a highly trained hospital staff.

There was another mother distracted with grief over the loss of her own child many months before. It required little effort upon his part to unite the two. Thus he saved a mother from almost certain psychosis and a baby from almost certain death.

Inspired by the well-rounded success in this case which had completely corroborated several opinions formulated after many years of

*Chairman's Address, Section on Pediatrics, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

thought and experience, an adoption nursery that was different, was organized by this pediatrist who was, as many of you have already suspected, Henry Dwight Chapin. Thus the young mother's tragedy brought and is still bringing happiness and joy to many.

One of the greatest and most tragically pathetic problems from the standpoint of racial development, national importance and—oh, so many other things—could be said to have been happily solved if every dependent child were so fortunate as the baby of the park bench. Unhappily this is not so. The vast majority of destitute infants who have been deprived of the normal nurturing of their own mothers and who must depend upon others for existence during the most important and dependent period of life, do not fare so well. When they are picked up by the kindly policemen, they may be taken to a hospital quite as good and their medical and physical wants may be adequately fulfilled by a staff with a desire prompted by the same sympathetic appreciation of their plight; with an equal ability acquired by study, training and experience, but all of this will be far short of what their Creator intended them to have.

Human experience from the very first feeble stirrings in the abyss of time has taught that the human species requires a much greater prolongation of maternal care than the offspring of any other animal. The family group, the oldest human institution, ante-dating both church and state, came into existence to meet these fundamental and necessary requirements. It has endured to the present time and the home has always been, is and always will be the nursery of human life. Anything short of this is inadequate for the development of humanity and civilization.

The park bench or the doorstep babies taken to the hospital may be bathed on the most elaborate vitreous bath slabs with chromard fittings by highly skilled nurses, then tucked in the most dainty and comfortable of cribs and have their nutritional requirements supplied, artificially, in the most carefully sterilized containers after being prepared under the direction of the best of us, according to the prevailing method, but the mortality among babies of this sort averages five times as much as those who are legitimate.

Those who survive and reach a stage where hospital care is no longer indicated join the pathetic little inmates of an institution, there to remain until they are able to go out into the world and shift for themselves or continue to be public charges in one way or another or, if they are more fortunate, there is still the chance that they may appeal to some childless mother.

I always try to refrain from adducing statistics to illustrate anything, but frequently I find that it cannot be avoided. The occasion has been taken to examine a number of contributions to the medical literature of the world on the mortality in institutions caring for foundlings. The term foundling is a stigma that I think should be abandoned.

From these, the findings of the American Association for the Study and Prevention of Infant Mortality have been selected as being representative. This Association obtained from the New York State Department of Charities, figures from 1909 to 1913 of eleven institutions in the state. During this period the death rate for babies under two years, based on the total number of children cared for, varied in the different institutions from 183 to 576 per 1,000, with an average mortality for the eleven of 422.5 per 1,000. During these same years the death rate for children under two years based on an estimated population for the state at that age, was 87.4 per 1,000, or about one-fifth of that in institutions.

Again, in studying a series of 1,738 institutional infants admitted at various ages under one year, 22.7 per cent of all admitted died before completing the first month of residence and 34.9 per cent before completing the second month. Including all deaths, 44.3 per cent occurred in less than one month after admission and 68.7 per cent in less than two months.

Less complete reports for the last few years from the same board indicate that the mortality in institutions other than hospitals is 50 per cent of the babies under one year. This is an improvement that would be expected to come with the general reduction in infant mortality in recent years, but as the same improvement has occurred among all babies, the ratio has probably not changed materially.

Now, of course, any contention that even the greater part of this mortality is due to the lack of maternal care would be nothing other than sentimental rubbish. Nevertheless, is there anyone so frigid as not to admit that even a very young infant craves, and responds to affection which seems to have a stimulating effect, particularly when there is drooping and lack of vitality? Are there any of us who refuse to acknowledge, regardless of the feeling of self-satisfaction and even exaltation which may

sometimes overcome us following the timely and appropriate use of a therapeutic measure, that the assistance of a mother may have been of value? It may have been the crooning of a foolish little lullaby known only to the mother and the baby, but it soothed the baby at an opportune time and persuaded it to live.

To the incredulous who may regard this as overdrawn, let me say that the late Luther Emmett Holt in his very last message sent back to us from China a few weeks before his passing, invited our attention to the fact that there was even such a thing as "outgrowing" disease. If anyone has any doubt of this, it will be dispelled by reading Holt's communication.

Regardless of the desire and willingness of attendants in any institution to try to satisfy the pitiful cravings of the little waifs, it is realized only too well by all of them that no one can gratify this affection hunger quite so well as a mother. Moreover, if the attendants could, they simply do not have the time to meet these requirements, which the little kiddies cannot understand why they are not privileged to expect.

In studying the effect of the institution on a child it seems, then, that something besides mortality must be considered. Very little accurate study has been done to determine what effect the institution has upon the mental development of children, but investigations which have been made in a carefully controlled and systematic way seem to indicate that about 20 per cent of the institution children are retarded three terms or more in school, as compared to 12 per cent among others. The intelligence quotient also has been found to be appreciably lower in institution children. These findings are nothing other than those which would be expected. They are by no means difficult to explain.

Psychologically considered, an infant's mind before birth, if the word "mind" can be properly used here to mean the total of all those tendencies which involve the individual as a whole, is generally described by psychologists as one of unconditioned omnipotence. Every function (eating, breathing, etc.) being performed for it by its mother, no desires can arise because everything is furnished before a need for it is permitted to exist. All this is changed, however, at the moment of birth. The baby must begin to eat for itself, breathe for itself and perform many other functions for itself. It is from this point on that desire begins to play a large part in the baby's psychology. As a rule, the baby's early desires are met as they arise, but as sense organs develop and its relation to environment requires more and more complex adjustments, the fulfillment of these desires becomes overwhelming. A discrepancy between desire and attainment becomes more and more in evidence. The extent of this discrepancy between desire and attainment will depend directly on those to whom the baby must look for the fulfillment of its desires. As previously mentioned, the physical and nutritional desires may be met by anyone, but there are desires which a baby craves that can be fulfilled only by a mother or one with a sincere desire and the time to act as a mother.

If these cravings of the institution baby or young child are not altogether satisfied, and they usually are not, for adequate reasons previously mentioned, a conflict between desire and attainment ensues. In this conflict will be found the very basis of mental life and the fundamental fact of consciousness.

Visualize for the moment the new baby on your hospital ward and you have the picture of the dependent baby just admitted to the institution. I detest the designation foundling home or asylum. Suppose, for example, it is a child just able to stand. For the first few days you will find it at the foot of the crib holding out its hands to everyone that approaches within sight. You pass through on your rounds, pet it a little and make use of a few of your stock baby expressions and pass on. The nurse or attendant, however willing and anxious, cannot stop to coddle this baby. The result is a very disturbing emotional outburst or what some are fond of referring to as a "tantrum." There may be one or two, or five or six. Anyway, they continue more or less vigorously until the child reaches a stage where it is said to have been "disciplined."

Call it that if you wish, but the child has found relief in precisely the same psychologic manner followed by any other individual with a mind. In other words, confronted by the problem of this acute discrepancy between desire and attainment, the solution could be found only in one of two ways. The first is in complete fulfillment of the desire. This had failed even after effort on the part of the child. The second is to phantasy that the desire is satisfied. I am not willing to agree, however, with some psychologists that phantasy exists so early, although I believe that it may run rampant a few years later.

It is more probable that, instead of seeking relief in wish-fulfilling phantasies, the apparent satisfaction of the desire or state of complete discipline resulted from the relinquishment of immediate satisfaction or, more technically, from its repression.

Now let it be recalled that this process of repression means the constant crowding of material into the unconscious, that region which any informed psychiatrist will freely admit is the repository of a large number of the episodes which form the historical background of the mental illness in later life which he is called upon to diagnose and ameliorate, if possible.

Of course, every child born must, in the course of its psychologic development, satisfy this discrepancy between desire and attainment by repression or, later, by wish-fulfilling phantasies, for the reason previously mentioned, that no amount of watchfulness on the part of even a mother can gratify all of its desires. Indeed, the gratification of too many desires, as is so often seen, for instance, in an only child, creates an inability to react properly to even the most ordinary situations and results in serious maladjustments to conditions arising in later life.

As a general rule, however, the pendulum is the other way with the institutional child. It is required to repress far too many desires into the subconscious, and most of these desires are for affection of the kind that only a mother can be expected to supply. Frequently, when these desires can no longer be repressed as they ordinarily are and an emotional outburst results, the child is unwittingly punished by a well-meaning attendant for what is mistaken for an "uncontrollable temper." The punishment which it rightfully considers unjust adds nothing to its contentment. The immediate effect of this punishment is bad enough, but it does not require a vivid imagination to visualize the possible effects on the future life of the child.

As it grows older and begins to realize its position, it is not at all surprising if it becomes anti-social. The punishment of the well-meaning attendant in the institution becomes no longer effective and the child is regarded as incorrigible. It is then transferred to a reform school. This frequently leads to the juvenile court or even worse.

In spite of the extraordinary progress that civilization has made, society does not seem to have been able to change its attitude towards the illegitimate child. This medieval attitude which was based on the allegoric oraclizations of the early soothsayers who offered them in response to the demand and for the consumption of the submerged of all ages, seems to have endured to the present time.

Now, I want to disavow most emphatically any intention to disparage the work of any institution; for with rare exception, the good women who give up their lives to the care of dependent children deserve nothing but gratitude and respect. There is no work that I can think of that entails more self-sacrifice or merits greater reward. Indeed, it cannot be more effectively summarized than in the words of the eminent New England divine, Phillips Brooks, when he said:

"He who helps a child helps humanity with a distinctness, with an immediateness which no other help given to human creatures in any other stage of their human life can possibly give again."

In fact, no one is better qualified to attest the bitter truth of what I have said concerning the plight of the dependent child than those good women who have been through the ordeal of watching a discontented child die when the physical causes were apparently insufficient. The suggestion that there must be a contributing factor first came from them. Is it the lack of what I have chosen to call the urge to live?

What is the solution of this perplexing problem? Is it anywhere in sight? I doubt it. Nevertheless there is much that can be done at least to improve conditions.

It is agreed that the human family group and the home is the normal nursery of every baby. An ideal solution then must consider the means of providing an environment which will approximate this normal nursery as far as possible. I am not so optimistic as to believe that this ideal can be attained for every dependent child, but that is no reason why every effort should not be made to attain it for as many as possible.

I do not agree that the time has arrived when institutions must go. I doubt that such a time will ever arrive. If it did it would be no more possible to get the unanimity of opinion necessary to close them than it is to convince everyone that the number of illegitimate children has been increased to no small degree by the advent of the hip flask which came into existence as a direct result of the Volstead Act.

Anyway, a certain number of institutions will always be necessary and desirable, but every effort should be made to limit their use to temporary receiving homes. In other words, the

babies should be kept in the receiving home as short a time as possible.

From this home they may be sent out to carefully regulated boarding homes. I repeat, carefully regulated, for I have known such a place to enjoy the support and endorsement of the best people in a community, only to be shown up subsequently as an infamous hovel little better than the one in the film portrayal "Sparrows." In fact, one of the most gratifying experiences that I have ever had was on an occasion when I assisted in closing up such a place.

Boarding homes, to be effective, should be as closely supervised as the larger institutions. They may be affiliated with the receiving institution. The smaller they are the better. So far as I know, the best method in use is that employed by the Speedwell Society, in each unit of which there is a salaried physician and nurse, with a committee of women possessing adequate qualifications to exercise general management of the work.

Such homes fill a definite place in the care of dependent children and more nearly approach the ideal, their ultimate happy adoption, than the conventional institutions. In them it is more feasible to give the individual care and attention so necessary to improve their physical appearance which facilitates their adoption.

At this point there is a distinct need for more organizations composed of individuals with breadth of vision, infinite tact, profound appreciation of the dependent child's plight and finally tolerance. The function of such an organization should be to act as a liaison agency between the babyless mother who wants a baby and the motherless baby who needs a mother.

It may be said that there are many such organizations in existence. There are, but with a few exceptions, the angle from which they approach the delicate task and the complicated "red tape" with which they surround it is not infrequently saddening. The trouble is that there are too many well-meaning women, and sometimes men, associated with these organizations who lack one or all of the qualifications which have been enumerated and which are so necessary to handle a situation that is sometimes extremely delicate. Indeed, always delicate.

For example, too much time and money has been lost in the effort to keep the illegitimate baby and the unwedded mother together, or to find the father and compel him to support the child. Moreover, time and money are expended to encourage legislation along these lines. From the practical results obtained such effort is as grimly ludicrous as the Dayton obscenity or the Chicago school-book buffoonery.

I have known of several refined couples desirous of adopting a baby who became completely discouraged because of their experience with organizations composed of women who did not have the tact or subtle discrimination necessary to handle the requirements of an individual case.

The ultimate and ideal goal, then, obviously is to find a real home for as many dependent babies as possible, and it is in cases such as I have just mentioned that physicians in general and pediatrists in particular can best serve. Doubtless many of you have already officiated in one of these joyous episodes. If you have, you already know the extreme satisfaction in store for those who have not but whom we want to encourage to begin.

Was it not great to realize that you helped a little dependent kiddie to get a real mother and a home with all that it implies: parental care and affection and an opportunity for the full expression of childhood instincts and emotions, a chance for education and recreation and everything, without the handicap of a stigma?

This, after all, is the ideal solution and goal. Sadly I realize, however, that only a certain percentage of the dependent children can reach it, but I am also convinced that more can be helped. If my effort to portray the plight of the dependent child will create in you a desire to develop the hobby of uniting the baby who needs a mother and the "mother" who wants a baby, and if each of you will bring about just one union of this sort in the coming year, I shall be grateful beyond expression.

If you do, when you get well on down the trail where the shadows begin to lengthen towards the east and the valley leading to Elysian Fields is just ahead of you, when "the bird of time has but little way to flutter," when you look back over your path and contemplate this deed, the peaceful satisfaction which will creep over you will completely overcome any regrets which you may have.

THE RELATION OF THE ACNE BACILLUS TO ACNE VULGARIS: EXPERIMENTAL OBSERVATIONS*†

By LLOYD W. KETRON, M.D.,
Baltimore, Md.

Since the discovery of the acne bacillus in the comendones and pustules of acne vulgaris by Unna and its isolation from seborrheic filaments and successful cultivation by Sabouraud, interest has centered mainly around the etiologic relationship of bacteria to the disease. Various conditions, particularly those which tend to lower body resistance, may act as contributory factors but are not generally assumed to be the direct cause of the affection.

Two organisms, the acne bacillus and some variety of a white staphylococcus can nearly always be recovered from acne lesions but the question of their importance in the etiology of the disease has given rise to widely divergent opinions. Some authorities hold that the acne bacillus plays no active role in the disease; others believe that it is capable of producing both comedones and pustules, whereas a third group maintains that the addition of the staphylococcus is necessary to suppuration. It must be borne in mind, however, that at the time when most of these investigations were carried out only aerobic methods were used in cultivating the acne bacillus, and only a few workers were successful in growing it. Experience has proved that the organism grows best under anaerobic conditions, although by means of appropriate transfers a moderate growth can be obtained aerobically. It is best cultivated, however, on certain kinds of media, the appropriate hydrogen-ion concentration being of vital importance.

Ketron and Burky[1], and later Ketron[2], have shown that most strains of the acne bacillus are, culturally and morphologically, fairly constant organisms, varying no more than many of our best known bacteria. They encountered one variant, however, chiefly in seborrheic filaments, that differs so much from the usual variety that they refer to it as acne bacillus B, in contrast to the common form which they call acne bacillus A. They believe that this B variety has been largely responsible for the diversity in the findings of different investigators, inasmuch as there is the widest variation in the morphologic appearance of the same strain under various conditions, differences in the age of the culture being quite important, as well as between different strains under the same conditions. It also adapts itself better to aerobic cultivation and is in general more easily cultivated than the A variety. Since, however, it is not so commonly found in comedones or pustules where the A variety is constantly present, it probably does not play an important role in the production of acne.

I shall now briefly enumerate some of the experimental observations which have been carried out by different investigators in attempts to prove an etiologic relationship between the acne bacillus and acne vulgaris. Some observations of my own will also be incorporated.

Reproduction of Acne Vulgaris in Man by Inoculation with the Acne Bacillus—This procedure has been generally followed by negative results. Flemming[3] alone claims to have reproduced pustules on the arm of a patient by rubbing in a culture of the acne bacillus. Negative results have been recorded by Molesworth[4], Haase[5] and others.

Pathogenicity of the *Organism for Animals*—Inoculation of animals with the acne bacillus has been followed by both positive and negative results, success being reported by Gilchrist[6], Engman[7] and by Südmersen and Thompson[9],

Gilchrist's experiments were limited to three animals, two mice and one guinea-pig. One mouse was inoculated subcutaneously with a large quantity of the bacillus and died two weeks later. Cultures from the heart's blood and peritoneal cavity yielded a bacillus similar to the one injected. The second mouse was inoculated in a similar manner with another strain of the acne bacillus and died after eight days. Smears from the peritoneal cavity and heart's blood showed a few scattered bacilli, but cultures were negative. Cultures were positive, however, from the peritoneal cavity which showed a marked peritonitis.

The guinea-pig was inoculated subcutaneously with the bacillus and died in a week. The autopsy revealed a marked peritonitis and fluid in the pleural cavity. The liver showed a few small nodules containing cheesy masses. Smears and cultures from the peritoneal cavity, heart's blood and one of the nodules showed the presence of the bacillus.

All of the animals showed pus at the site of inoculation and in this the bacilli were found.

Südmersen and Thompson used only one strain of a bacillus which they had isolated from a comedone in their animal experiments. The material was obtained from a 6-day-old culture on acid blood agar, although they state that an acid medium was not necessary for the growth of the organism and that on several media it grew equally well aerobically or anaerobically.

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†From the Johns Hopkins, Medical School, Department of Dermatology.

The authors used one rabbit, two guinea-pigs and two mice. The rabbit was injected intravenously with two loopfuls of the organism, with negative results. One of the guinea-pigs received two loopfuls intraperitoneally and was killed after 14 days. At autopsy a few nodules were found in the spleen and there was some enlargement of the mesenteric glands and a few areas of consolidation in the lungs. No note was made of subsequent findings in this case. The second guinea-pig was inoculated with two loopfuls subcutaneously with negative results.

One of the mice was inoculated intraperitoneally with one loopful of the bacillus and died in ten days; the other received one loopful subcutaneously and died in two days. Autopsies on the mice showed enlargement of the spleen and lymph glands, with partial consolidation of the lungs. The acne organism was recovered in pure culture from the seat of the subcutaneous injection and was demonstrated microscopically in the spleen pulp, but no growth resulted from the inoculation of media with the peritoneal fluid or portions of mesenteric glands.

The authors conclude that the organism is fatal to mice but not to guinea-pigs.

Engman states that he has found the acne bacillus to be fatal to rabbits and guinea-pigs and has recovered the organism at autopsy. He gives no details of his experiments.

I shall here report briefly some experimental observations on the pathogenicity of the acne bacillus for animals which have been conducted by Ketron and Brown and which will be published later in detail.

In these experiments six strains of the acne bacillus A and one of the B variety were used. They were isolated from sebaceous filaments and active acne lesions. The material for inoculation was obtained from broth cultures* and from agar slants, which had been incubated anaerobically for from five days to two weeks. Suspensions of the bacillus were made either in salt solution or in the broth in which it had been grown. These suspensions contained enormous quantities of bacteria, often as much as 10 per cent, as measured by the amount of sediment after centrifugalization.

(1) *Mice.*—Nine animals were used in this experiment. Six were injected intraperitoneally with 0.1 c.c. of a heavy suspension of the different strains of the bacillus and one received 1 c.c. Two were injected with similar amounts subcutaneously. One mouse died after a few days, but when found was too far decomposed to admit of an autopsy. Of the remaining eight, one was killed after four days and the rest after intervals of three to five weeks. No gross pathologic lesions were found at autopsy and none of the mice appeared to be sick during the time in which they were under observation.

(2) *Guinea-Pigs.*—Six animals were injected intraperitoneally with 0.5 to 2 c.c. of suspensions of the various strains of acne bacilli. Unfortunately four of them died after intervals of six days to three weeks from pneumonia, due to a streptococcus. At autopsy nothing was found to suggest an associated infection with the acne bacillus, and cultures from the peritoneal cavity of two of them did not show the acne bacillus. Of the two remaining, one was killed after eleven days and the other after two weeks. They both appeared healthy and normal in every way. At autopsy nothing was found except a few small whitish soft nodules under the visceral and parietal peritoneum of each animal. These contained a thick pus and cultures gave a pure growth of acne bacilli.

(3) *Rabbits.*—Seven rabbits were injected intraperitoneally with 2 to 3.5 c.c. of suspensions of the various strains. One rabbit was killed after twelve days, one after sixteen days and one after 40 days. All showed pin-head to pea-sized whitish nodules under the peritoneum, particularly in the omentum. Pure cultures of the acne bacillus were obtained from these abscesses, but only a few colonies developed from the pus of the rabbit killed after the longest interval. Two other animals, when they appeared to be in bad physical condition, were killed, one after three weeks and the other after four months. The former showed a severe coccidial infection of the liver and the other only extreme emaciation and impaction of feces in the large intestines. Of the remaining two one was found dead after four weeks and at autopsy some hemorrhagic areas in the intestines were the only lesions demonstrable. Cultures from the peritoneal cavity showed one colony of the acne bacillus. The other rabbit was still living after five months.

Six rabbits were injected intravenously with 2 to 4 c.c. of the various strains. Three died after five to six weeks and another after six months. Nothing was found at autopsy to suggest infection with the acne bacillus and cultures were negative. The remaining two were killed after two months and the autopsy findings were negative.

In order to determine what part of the changes in the peritoneal cavities of the rabbits and guinea-pigs might have been due solely to the action of the bacillus as a foreign protein, one rabbit was injected intraperitoneally with an emulsion of killed acne bacilli. The animal

*All media contained 1 per cent dextrose and had a pH of 6.8.

died after two weeks and at autopsy numerous abscesses* were found in the peritoneal cavity similar to the ones produced with living organisms.

Another rabbit was injected intraperitoneally with 2 c.c. of a thick emulsion of a killed white staphyloccoccus. It died in 11 days and showed also similar abscesses in the peritoneal cavity as well as congestion of the lungs. A pure culture of the colon bacillus was obtained from the peritoneal fluid.

The same authors also made numerous attempts to produce local infection in the skins of rabbits by intradermal injections of the acne bacillus. When heavy suspensions were injected, small, acute, abscesses resulted, which when they did not break through the surface, lost their inflammatory character after a few weeks and some of them persisted for several months as soft non-inflamed pea to bean-sized nodules. We thought at first that we had a definite infection but were later able to produce the same reaction with dead organisms. In one case cultures from the abscess were positive as long as seven weeks, but the number of colonies, after a short period, became progressively smaller as the lesions became older.

Agglutination—Gilchrist[9] was the first to report positive agglutination of the acne bacillus with the serum of acne patients. Sera from seven acne cases were tested and all agglutinated the organism in dilutions varying from 1 in 10 to 1 in 100, it being noted that the weaker the dilution the more marked was the clumping of the bacilli. Sera from five normal cases were tested, but agglutination was slight and it was entirely absent in the 1 to 100 dilution.

Flemming[10] reported some positive results from five strains of the acne bacillus, but does not state the total number of cases tested. Three of the sera were from the same patients as three strains of the bacillus. Of these three sera one showed no agglutinating power, another agglutinated the homologous strain in an 18-fold dilution; the third agglutinated its own bacillus in a 54-fold dilution and one of the other strains in a 6-fold dilution. The sera from two patients who were being inoculated with a certain strain agglutinated it in a 32-fold dilution. The normal sera (number not stated) showed no agglutinating power in a 4-fold dilution.

Negative agglutination results have been reported by Whitfield[11] and Engman.[12]

Through the courtesy of Professor J. Howard Brown, agglutination tests with sera from 15 cases of acne and five controls were carried out in his laboratory in the Department of Pathology and Bacteriology at the Johns Hopkins Hospital. The work was under his supervision and the results were personally interpreted by him. Small precipitation tubes were used, 0.25 c.c. of the bacterial suspension in normal saline solution being mixed with 0.25 c.c. of the various dilutions of the serum. Each serum in final dilutions of 1 to 10 to 1 to 320 was titrated against emulsions of two strains of the acne bacillus which were taken from fresh anaerobic cultures on acid dextrose-agar. Some of the tests were also repeated with organisms which had been cultivated in broth anaerobically and preserved for a few weeks in a 1 per cent formalin solution. The tubes were incubated for two hours at 56°C. and the results tabulated. They were again observed after having been in the refrigerator over night. No agglutination occurred after incubation for two hours. After refrigeration over night, however, considerable precipitation had taken place in all the tubes, but this was present in the sera from the control cases as well as from the acne cases and also in the control tubes, which contained only the bacterial suspension in salt solution.

Positive agglutination was obtained with the sera of two rabbits, which were injected intravenously with live cultures of the acne bacillus. One rabbit received, at approximately weekly intervals, four injections of 7 to 10 days old broth cultures of strain 41. At the first injection the animal was given the whole bacterial content of a broth culture concentrated to two c.c. At each subsequent injection the amount of bacteria was increased by the contents of one culture tube, so that on the fourth injection the rabbit received the bacteria contained in four broth cultures. This amount was too thick to inject in a 2 c.c. broth emulsion and enough broth was added to make a total of 4 c.c. Ten days after the last injection the serum of this rabbit was titrated with strains 41 and 44 as antigens, the tests being made with the same technic and simultaneously with some of the titrations of human sera. Agglutination occurred in dilutions of serum up to 1 to 160. Slight agglutination was present also in the 1 to 320 dilution.

The same experiment was carried out with strain 44 as the antigen, but unfortunately this

*All of these abcesses were only nodular collections of pus with very little, if any, surrounding inflammatory reaction.

rabbit was injured and his serum had to be titrated after he had received only two injections. The serum gave a moderate agglutination in all of its dilutions with strain 41, but showed only slight agglutination against the homologous strain in the 1 to 10 and 1 to 20 dilutions.

Complement Fixation.—Haase[13] tried the complement fixation reaction with the blood serum from ten cases of acne. Complete fixation occurred with the sera from five of these cases and partial fixation in one. He used as an antigen a strain of the acne bacillus obtained from a commercial laboratory. He also used as antigens the diplococcus of Varney and Clarke and a strain of the "milk-white coccus" obtained from Schwenter-Trachsler. The former gave fixation in only one case of acne, while the latter showed fixation in the same case and partial fixation in two others. Haase also attempted to immunize a rabbit with each of his antigens by repeated injections of killed cultures. Complement fixation with both staphylococcus antigens occurred with the sera from all three rabbits but the serum from the rabbit immunized to the acne bacillus was the only one that caused fixation with the acne antigen.

Strickler, Kolmer and Schamberg[14] also obtained some positive results with this procedure. They used an antigen prepared from one strain of the acne bacillus and polyvalent antigens from various staphylococci and colon bacilli. Of the sera from 57 cases of acne, 48 gave a positive complement fixation with the acne antigen and 36 with the staphylococcus antigens, the results being similar whether the coccus was the white variety obtained from acne lesions or the yellow variety obtained from furuncles. With the acne antigen positive fixation also occurred in two-thirds of the cases of acne rosacea and in about one-third of those of seborrheic dermatitis. Positive fixation was present with the sera of almost 67 per cent of the acne cases with the colon bacillus antigens, while only 15 per cent of positive reactions were obtained from none-acneiform skin affections.

Cutaneous Reaction with Filtrates from Cultures of the Acne Bacillus and Bacterial Emulsions.—In order to determine whether the acne bacillus formed in cultures any kind of a filtrable toxin to which acne patients might show a hypersusceptibility the following procedure was undertaken.

Two strains of the bacillus were used, strain 41 isolated from a seborrheic filament, and strain 44 from an acne nodule. The organisms were cultivated anaerobically in acid dextrose broth for 10 days. The cultures were then passed through a Berkefeld filter and various dilutions used for the tests after adjustment of the pH to 7.6. Some of the fresh broth after adjustment of the pH to the same reaction as that of the filtrates was used as a control.

The tests were made by injecting about 0.1 c.c. of the substances intradermally into the flexor surface of the forearm. In the beginning the filtrates from both strains were used in undiluted, 1 to 10, 1 to 50 and 1 to 100 strengths. After several tests had been made, however, and the reactions had been found to be the same with both filtrates, only one was employed in the remaining tests. The weaker dilutions were also used only when indicated by the degree of reaction in the stronger dilutions.

The test was carried out on 20 cases of acne and 16 controls, the latter consisting of patients with various cutaneous disorders as well as some normal volunteers. The reaction was of the delayed inflammatory type, appearing usually after the elapse of 12 to 24 hours and fading in one or two days. Immediately after the injection, hive-like papules appeared, varying in size in different subjects, and usually disappearing in a few hours. The delayed reaction to the undiluted filtrate varied in the different patients from two to six cm. in diameter. It also varied in degree from a very faint to an intensely red erythema associated with slight swelling and tenderness to pressure. Occasionally the outline was sharply defined, but often it gradually faded into the surrounding tissue. Some soreness of the arm was complained of by a few of the patients showing the most intense reactions, and one acne patient developed swollen axillary glands. The majority of the cases tested showed well marked reactions and only three in the acne series and five in the controls, were recorded as being entirely negative, although some recorded as positive were only very slightly so.

The degree of the reaction appeared to have no definite relation to the mildness or severity of the acne, and some of the controls reacted just as intensely as the acne patients. Altogether, there was not enough difference between response of the acne patients and the controls to justify the belief that there was any hypersensitivity to this toxic substance on the part of the former. With the weaker dilutions, 1 to 50 and 1 to 100, there were no marked reactions, but a few cases showed reactions to the 1 to 10 dilution almost as large as to the undiluted filtrate. Some of the filtrate was heated for half an hour at 80°C. without affecting its toxicity. A few tests were also carried out with a filtrate made from an 18-day-old broth culture, but it did not appear to vary in its toxicity from the 10-day-old filtrates.

While the filtrates were being used, a majority of the patients were also tested with a 1 to 1000 emulsion of the killed acne bacillus in salt solution. They all showed a small papule at the site of the injection, which occasionally was quite sore to the touch and some of these had

a hemorrhagic center. The papule was often surrounded by a small inflammatory areola, which, however, was not marked enough to be looked upon as a positive allergic reaction. One acne patient, however, in response to the bacterial emulsion in 1 to 10,000 dilution developed an inflamed hemorrhagic, vesicular papule, which healed with a slight scar formation. This was the only subject that possibly might have been unusually hypersensitive to the bacterial protein. Altogether, no noteworthy difference was recorded in the degree of reaction between the acne patients and the controls.

COMMENT

The experimental observations herein reported present evidence that the acne bacillus is not pathogenic, or only very slightly so, for the usual laboratory animals and that those affected with acne do not develop agglutinins against the acne bacillus, although this organism is capable of stimulating this type of bodily reaction when injected alive in large quantities into rabbits. It is granted, however, that these results have only a negative value and adduce little evidence in support of the theory that the acne bacillus plays no role in the etiology of acne vulgaris. It is quite probable that in the average cases of acne, infection in the skin, if it occurs, is not severe enough to call forth the development of agglutinins. The cases in the series herein reported included mild infections, as well as those of moderate severity, but we had at our disposal none of the most severe types, such as acne cachecticorum, when the tests were being carried out. Whether the acne bacillus is pathogenic or non-pathogenic for animals would be of little value in establishing its etiologic relationship to acne vulgaris, for in man it requires a special soil for propagation and its action, so far as is known, is entirely limited to the skin.

The organism apparently lives and propagates on the skins of all persons in which the secretion of sebaceous material is sufficient to provide a culture medium. It is found in the largest numbers and often in pure culture in the seborrheic filaments of the nose, irrespective of whether or not the subjects have acne. Here it may live as a saprophyte without evoking any reaction on the part of the host. It is also found in comedones, acne pustules and nodules, usually associated with a staphylococcus, but in the two latter lesions, it apparently often occurs in pure culture. This may or may not have a significant bearing on its etiologic relationship to acne. It is quite conceivable, as suggested by Whitfield, that the presence of the organism in these lesions may be due to their release from the partially digested comedo around which the inflammatory reaction takes place. Our experiments with the intradermal injection of the organism in rabbits show that it may remain alive in the lesions as long as seven weeks, without definite evidence of infection. The fact that the staphylococcus is frequently not found in the indurated nodules may be explained by the assumption that these organisms are relatively soon killed off after the inflammatory reaction has started and that the lesions persist, as a result of the presence of foreign material from the comedo and the acne bacillus, acting passively as a foreign protein. Our experiments lend some support to this supposition, since intradermal abscesses in rabbits produced with either living or dead acne bacilli, if ulceration and extrusion of the pus does not occur, may persist for several months. Similar lesions produced by dead staphylococci and streptococci were absorbed very much sooner.

Vaughan[15] has shown that the toxicity of the powdered cellular substance of bacteria does not always correspond to its infective properties. For example, prodigiosus is almost three times as toxic as the diphtheria bacillus.

That some other factors besides the staphylococcus play a role in the production of acne, especially the indurated type, is indicated, as first pointed out by Unna, by the pathology of these lesions. They often show a granulomatous infiltration with giant cells which does not correspond to the type of inflammatory reaction caused by the usual staphylococcic infections of the skin. Study of the pathologic response to the injections of live or dead acne bacilli in the skins of rabbits also supports this conception, since we found here large numbers of giant cells associated with endothelioid and plasma cells, a type of reaction which differs considerably from that caused by the common staphylococci infections.

It has been shown above that the acne bacillus in broth culture liberates a toxic substance either through cellular metabolism or disintegration, which when injected intradermally may cause in the majority of cases of acne, as well as in controls, a delayed inflammatory reaction. This reaction, however, is not confined to patients affected with acne and, as MacKenzie and Hanger[16] have shown, can be produced by filtrates from streptococci, staphylococci and other organisms. If such a toxic substance were liberated by the bacillus when growing in the

skin, one would expect to find the most marked reaction around the seborrheic filaments in the nose where the organism is found in greatest numbers, whereas, as a matter of fact, this location is the site of active inflammatory lesions much less frequently than most other locations on the face. This, of course, is doubtless due to the fact that here the follicular openings are larger and the follicles more shallow, so that complete blocking of the sebaceous secretions seldom occurs.

In presenting this review and some experimental observations on various problems concerning the acne bacillus and its relationship to acne vulgaris, it is realized that enough information is not yet at hand to venture a positive statement with reference to the role of bacteria in the etiology of the disease. It is believed, however, and some supporting evidence has been adduced, that the acne bacillus is an important factor, especially in the indurated lesions, and that in these it may be an active infectious agent or play only a passive role as a foreign protein, which may prove quite irritating to the tissues and is very slowly absorbed.

CONCLUSIONS

(1) Our own results, herein recorded, would go to show that the acne bacillus is not pathogenic for the usual laboratory animal, although two other investigators, using a much smaller number of animals, have reported positive results.

(2) Agglutination tests, when two strains of the acne bacillus were employed as antigens, gave negative results with the sera from 20 patients with acne and with 16 controls.

Agglutinins, however, were successfully produced in the sera of two rabbits by the intravenous injection of living acne bacilli.

(3) Undiluted filtrates from broth cultures of the acne bacillus, when injected intracutaneously, produce a delayed inflammatory reaction in the majority of acne patients and of controls.

(4) Some experimental results have been presented which suggest that the acne bacillus plays an active role in some of the lesions of acne vulgaris, passively as a foreign protein, if not as an active infectious agent.

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DISCUSSION (*Abstract*)

Dr. J. C. Michael, Houston, Texas.—Dr. Ketron's investigation explains some of the discrepancies that puzzled earlier workers. It also explains to a certain extent why the relation of the acne bacillus to acne has been such a debatable subject. While the essayist does not wish to be interpreted as furnishing definite proof that the acne bacillus is not the cause of acne, it appears that his work is suggestive in that respect. In regard to the etiology of acne, I would like to refer to the recent work of Siemens who has offered evidence that the skin upon which acne develops is, in most instances, an hereditary characteristic. That of course, is not a new idea but I believe Siemens' work offers the first reasonable proof of that assumption.

Dr. Ketron (closing)—I do not wish to leave the impression that my results mean that the acne bacillus has not an important place in the etiology of acne vulgaris. It is undoubtedly a fat saprophyte, being found in any skins where there is enough oil for it to grow in. This would not preclude its action in some skins as a pathogenic organism, or as a foreign body.

RELATION OF ALLERGIC REAGIN TO TRUE ATOPEN IN POLLEN*

By J. H. Black, M.D.,
Dallas, Texas

The early work done in this country in specific treatment of pollen disease was done on the assumption that the condition was fundamentally an anaphylactic phenomenon. Symptoms were explained as anaphylactic reactions occurring in particular tissues and treatment with specific pollens was believed to bring about a true desensitization. Investigations of the past few years have tended to throw much doubt upon this hypothesis and many workers have concluded that this condition is a type of hypersensitiveness entirely distinct from true anaphylaxis. Most of these have followed Coca in using the term "atopy" to designate the condition underlying asthma, hay fever, urticaria, and allied conditions.

Precipitin, which can be constantly demonstrated in the serum of anaphylactic animals,

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has not been shown to play any part in atopic hypersensitiveness, but Prausnitz and Kustner[1] discovered another reacting substance in the serum of the atopic person which is specific for the "sensitizing substance," and to this agent Coca has applied the term "reagin" and the sensitizing substance has been termed "atopen." It is not my desire to discuss the relationship of anaphylaxis and atopy, but to present briefly some evidence which has accumulated which casts some doubt upon the relation of the "reagin" to the clinical condition in pollen sensitive patients and to the true atopen in pollen.

A considerable amount of the immunologic work done with pollens is open to criticism because the workers did not keep in mind the fact that these extracts are composites and not solutions of the atopen alone. Evidence has been brought forward supporting the view that the pollen atopen may not be protein,[2 3 4 5] and the question naturally arises as to whether some of the reactions observed have been related to the true atopen or to some other part of the pollen.

That the skin reaction in atopy is due to the presence of reagin in the blood was shown as stated above. Levine and Coca[6] showed that the reagin content of the blood was directly proportional to the skin sensitivity. That it does not bear such a relation to the clinical hypersensitiveness is shown by the following: first, it is a matter of common knowledge that skin reactions may occur in the complete absence of clinical sensitiveness; second, that skin reactions may be persistently absent in clinically sensitive persons; third, that the skin reaction may persist unchanged in treated individuals with relief from all symptoms; fourth, that skin reactions may persist long after spontaneous cure of patients; and, fifth, that the size and intensity of the skin reaction have no relation to the intensity of the clinical condition.

Supporting the relationship of reagin to skin reaction in the foregoing variations, we have found: in a patient with perennial hay fever showing no relationship to ragweed pollen we elicited a large, typical skin reaction to ragweed pollen and demonstrated the presence of reagin in the blood. This patient showed no exacerbation of symptoms during the ragweed season and was totally unaffected by intensive ragweed therapy.

Occasional cases are seen which are clinically typically sensitive to certain pollens and respond to appropriate pollen therapy, but show no skin reaction at any time. Kahn[7] and I have done passive transfer tests with the sera of these patients and shown the absence of reagin.

All workers who have done skin tests upon the completion of pollen treatment find that, even though the patient may have obtained complete clinical relief, the size and intensity of the skin reaction may remain unchanged. Passive transfer done with the sera of these patients shows the reagin content to be unchanged.[8]

In a patient who has remained entirely free of all symptoms following a marked constitutional reaction to injected pollen, the reagin content of the serum a year later was found to be unchanged. In a patient nineteen years of age who had a grass hay fever which had spontaneously disappeared at the age of five years, the specific reagin is still present after fourteen years of clinical cure.

Since the reagin content of the blood parallels the intensity of the skin reaction and, since it is commonly known that the clinical condition may not be measured by the skin reaction, it follows that there can be no parallelism between reagin content of the blood and the degree of clinical sensitiveness.

It may be permissible, in this connection, to mention the drug idiosyncrasies. These conditions which may be entirely indistinguishable clinically from true atopy, do not, with rare exception, show skin reaction or reagin.

Coca and Grove[9] showed that in mixtures of reagin and atopen the reagin was neutralized, but Levine and Coca[10] found the singular fact that the atopen was unchanged. So far as our present knowledge goes, this has no analogue in immunology.

Although reagin may be neutralized in vitro by atopen, it is evident, from the finding of reagin after pollen therapy, that the amount used in the usual hypodermic therapy does not lessen the amount of reagin. Indeed, we have shown[11] that patients ingesting large quantities of pollen extract may show atopen and reagin existing coincidentally in the blood.

Baldwin found[12] in a group of thirty-six individuals in whom hay fever would be expected because of their heredity, that one gave a strongly positive reaction to ragweed and showed reagin present in serum, but remained clinically free and did not react to ragweed extract applied to the nasal mucosa. Five others developed positive skin reactions and hay fever. One of these showed clinical symptoms a year before his skin reaction appeared. Another had

a faintly positive reaction the first year he showed symptoms and a more marked reaction the second year. In six persons, then, giving skin reactions to pollen, there was definite dissociation of the skin reaction and the clinical condition in three.

Examination of our records of the past year show that there is no relationship apparent between the size and intensity of the skin reaction and the occurrence of constitutional reactions following therapeutic injection of pollen. Constitutional reactions occur as frequently in those patients giving small skin reactions as in those in whom the skin reaction is marked. There is, however, a definite correlation between the skin reaction and the constitutional reaction when the latter occurs at the time of testing. I have never seen a constitutional reaction occurring with the scratch method of testing, but, when it has resulted from intradermal testing, the skin reaction, with few exceptions, has been marked.

Assumption that the reagin is concerned in the mechanism of atopy leaves unanswered the question as to why it should be sometimes present in non-atopic persons and absent in those proven to be atopic; why it should persist after clinical cure and why it should commonly show a total lack of quantitative relationship to clinical sensitiveness; and why, since atopy is definitely an hereditary condition, there should be such dissociation as Baldwin[12] reported. It would seem that these questions leave the proof of the assumption unestablished.

Levine and Coca[8] assume that specific pollen treatment is not desensitization, because the reagin content of the blood remains unchanged, and suggest[6] that an additional factor must be present to account for clinical sensitiveness and find this in the "tissue factor" or "shock organ."[13] In this manner they explain not only the differential localization of asthma, hay fever and urticaria, but also provide a means of bridging the gap between the reagin and clinical hypersensitiveness.

Since the pollen atopen has never been isolated and even in digested and dialyzed solutions other substances may be present, it seems a logical question whether the reagin is not an antibody reacting with some other fraction of pollen than the true atopen. This assumption would offer an explanation for the presence of reagin in non-atopic individuals, since they may form antibodies to one fraction of pollen without the involvement of the other. For the same reason reagin may be absent in the atopic individual. Since the person might form reagin against one pollen fraction and also sensitiveness, with or without the intervention of another reagin, to another, a ready explanation would be found for the lack of quantitative relationship between reagin and clinical sensitiveness. The persistence of reagin after treatment or spontaneous cure similarly would not demand the conclusion that the patient was not desensitized nor would there be any difficulty in the finding of reagin and skin-reacting substance co-existent in the blood of treated patients. Neither would it require the relegation into an unnamed group of the drug idiosyncrasies simply because they do not show reagin.

Coca mentioned this possibility[13] only to dismiss it without discussion. The inability to secure the true pollen atopen in pure state makes it impossible to prove the truth of the hypothesis at this time, but it seems to offer a working theory worthy of more consideration than it has hitherto obtained.

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DISCUSSION (*Abstract*)

Dr. I. S. Kahn, San Antonio, Texas.—The vagaries of the pollen skin reactions are curious and explanations are always in order. Let us first consider the diagnostic skin test. Like the tuberculin test it is usually accepted as an antibody reaction, and its absence as an evidence of the non-existence of antibody formation. However, this will not explain all cases. At the end of successful pollen treatment, reaching identical final dosages, in one case the initial diagnostic skin test is reduced or eliminated; in another, with equally good clinical results it persists absolutely unchanged. Again, in certain cases, from five to eight very small dosages, several hundred times smaller than any protective dose, will give sharp cutaneous reactions and total clinical relief. If we grant that the ordinary line of treatment is a tolerance induction, certainly the not inconsiderable group of cases just mentioned cannot be so classified

and the results can only be explained by antibody excitation precisely as if we were dealing with a toxic bacterial process.

Complicating all this process is the fact that the structure, histologically, of the skin of the conjunctival, nasal, bronchial and intestinal mucosa are not identical, and there is no reason why sensitivity should necessarily exist to either, or all, or to a parallel degree in all these locations. Clinically this is not all invariably true. Conjunctival sensitiveness to pollen extracts is usually less than cutaneous. Even selectivity occurs. For instance, we see pollen hay fever with and without asthma, with and without urticaria, with and without diarrhea or intestinal symptoms. I have seen urticaria, angioneurotic edema and eczema entirely due to pollen. Again, I have a patient, a boy living on a farm, who has hay fever and asthma from grasses and ragweeks, and dermatitis of the legs from careless weed every time he walks through a patch. Another patient has asthma from feathers, and hay fever and urticaria from pollen.

Again, I have seen intense hay fever and asthma follow the injection of a pollen extract without the usual local skin reaction. Still further, we occasionally see postive skin tests to pollens and other reagins apparently of no clinical significance.

In a negative way, it is thus seen that there is at least clinical evidence bearing out Dr. Black's hypothesis that the true atopen in pollen is not necessarily the allergic reagin.

EVILS OF TOO MUCH MILK*

By EUGENE ROSAMOND, A.B., M.D.,
Memphis, Tenn.

I am going to present one of the things we meet in everyday practice, and wish to talk particularly to the general practitioner.

One of the evils of too much milk can be illustrated by two letters I have here, which I will read to you. The first one is as follows:

"My baby, thirteen months old, is always constipated and I want to know something to correct this condition. The doctor here gives him a prescription which contains some kind of oil, and he has to take one teaspoonful of this every night. I know this should not continue. In his diet he has orange juice and bacon the first thing in the morning, then oatmeal, cereals of other kinds, vegetables, apple sauce, milk, toast and other food for the year old baby. Besides this he drinks one quart of sweet milk each day. Also, his breath is foul most of the time. Would like to know a remedy for this. He sleeps very well, and gains all the time."

For a year old baby that is a fairly good diet and he drinks a quart of milk a day. His breath is foul and he is constipated. This mother was told to reduce the milk to a pint a day and to give the child more cereals. It worked well and the foul breath disappeared. I am not offering a cure for halitosis, but it is a fact that the baby who gets too much milk very frequently has a foul breath. An internist last night told me that he found this was often the cause of foul breath in adults, and that he frequently cuts milk out of the dietary for this reason.

The second letter says:

"I want to ask your advice about my baby. He is one year old and seems normal in every way except for his terrible constipation. Also, for the past two months he wakes two or three times each night, and sometimes I have to nurse him to get him back to sleep. I nurse him at six a. m. and at eight a. m. give him a bowl of cereal followed by a bottle of milk (cow's milk) with just a little water and sugar added. At ten o'clock orange juice, eleven a bowl of broth, strained, and more milk. At two I try to feed him carrots or spinach, but he will take only a few spoonfuls, followed by eight ounces of milk. Five p. m. bottle of milk, and he nurses again at eight. One of your patients told me you said nearly all colicky babies were hungry, and for the past week I have given him eight ounces of milk when he wakes before bedtime. He takes this but it doesn't seem to help any. His stools are yellow but very hard, and lumpy, and he strains frightfully and I have to help him with enemas, and I give him milk of magnesia every other night. * * * * *"

Summed up, this baby one year old gets about forty ounces of milk, plus two nursings, plus cereals and vegetables, of which he gets very little. Here we have a constipated baby who is getting too great a quantity of milk, and who is restless and wakes up at night because he is uncomfortable. I do not think these babies who get too much milk "drown out their digestion." I have very little patience with the idea that we should not drink much at meal time because we "will dilute the gastric juice." I think the stomach knows more than we do. It seems to know what to pass on, what to hold and so forth, but the babies who get too much milk are simply babies who fool themselves, like the man who eats too much soup and then is too full to eat the meal.

Here is the history of another baby:

S. B., female, aged 19 months, was a full term baby. Her birth weight was 7¾ pounds. She cut her first teeth at six months and walked at 12 months. She was breast-fed until she was 12 months old. At 19 months she takes a bottle of a cow's milk formula. She has been a happy and contented baby and has gained weight normally. She had influenza at seven months, tonsillitis at 12 months and has had frequent colds but has never been seriously ill.

When she was brought to us she was still taking the bottle, and getting one quart of whole boiled cow's milk daily. In addition she was eating cereals, green vegetables, stewed fruits, eggs, potatoes, custards, puddings, bacon, chicken and scraped beef. She would eat heartily

*Clinic, Clinic Session, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

if diverted and fed by her mother. Her bowels were regular but her breath was often bad in the morning. She would stand up in bed from two to five times each night, crying and calling, and it was sometimes an hour before she would go to sleep again. She was nearly always wet. She had a bottle of milk at 3:00 p. m. and another at bedtime. The physical examination was negative, except that the skin was a little sallow and pale and the muscles were a little flabby. We advised that she be given no milk except on cereals.

Three weeks later she was sleeping all night and the diapers were frequently dry in the morning. She ate heartily and then was receiving only 16 ounces of milk a day. Two weeks later there is a note to the effect that "everybody is happy and the baby sleeps well."

This child, nineteen months old, seemed to be well except for being awake most of the night, but she was getting one quart of milk a day and eating heartily besides. The excess milk was taken away and she was all right within a short time.

Another baby, M.S., aged 13 months, had whooping-cough and eczema. She was a full term, normal baby, and was breast-fed for five months. Then she was weaned and several different kinds of food were tried. At 10 months she was put on cow's milk. She was subject to colds and had diarrhea for two weeks when she was five months old. She had whooping-cough at that time and several subsequent febrile attacks. During one of these the glands of the neck were swollen. She was well nourished, weighing 18 pounds and 15 ounces. She was getting six bottles of milk daily, each containing eight ounces. She also took cereals, vegetable broths, prune and orange juice. She slept well, but was constipated and her breath was frequently foul. She had pus in the urine.

This is the only case in which we possibly have some allergic trouble. This baby was given citrate of potash, and was put on one pint of whole, boiled, cow's milk, with vegetables, stewed fruits, custards, puddings and bacon. Three and a half months later she was brought in again because of an acute attack of influenza. She had gained five pounds and the eczema disappeared in five weeks after this change in diet. She had remained well until the entire family developed influenza.

The next baby, R.H., was a boy aged three years. He was a full term, normal baby and was breast-fed for sixteen months. He was a happy, contented and well nourished baby until he was about a year old, but would never eat well. He was given cow's milk, sweetened with condensed milk, and weaned himself at sixteen months. He still would not eat well, but took five pints of milk daily, some meat, eggs and desserts. He had been given cod liver oil, but was brought to me because he was puny, constipated, fretful, wakeful, was wetting the bed several times each night and often was found eating dirt. He was pale and anemic looking, pot bellied, and sweated easily but his head did not sweat on the pillow. His head was normal and there was no sign of rickets; the tonsils were large and spongy and the glands in the neck were enlarged. Examination of the heart revealed a systolic murmur at the base, which was not transmitted. The abdomen was large and tense but the veins were not prominent. The liver and spleen were not enlarged. A skiagram of the wrists showed no marked change from normal.

Our diagnosis was too much milk, slight anemia, and possibly rickets. We advised that he be placed on a diet containing no milk at all, but that the meat, eggs, vegetables, bread, butter and molasses be continued, and that he receive 1 ounce of cod liver oil daily.

The next day the mother phoned that the boy refused to eat. She was encouraged and told to give him a tea party and see if he would not eat solid food in that way. The boy starved himself for three days and cried for his milk all the time, and then ate only bread and butter and molasses for an entire day. He is now eating fairly well and has gained slightly. He was given a little Fowler's solution and two weeks later was eating heartily, sleeping well and not wetting the bed. Neither had he been caught eating dirt.

J. H., aged five years, is an only child. He was a full term normal baby, weighing ten pounds at birth. He was breast-fed for twelve months. He was brought to me to determine whether the tonsils and adenoids should be removed, because for six months he had refused to swallow solid food. He would chew up the food, gag and spit it out. He was very fond of milk and took five pints daily. He was also given a nickel each day with which he bought chocolate milk.

He was a bright, alert, nice looking boy, who knew his letters and could recite verses. He bit his nails and both the mother and child gave the impression of being neuropaths. The tonsils were large but not diseased. Physical examination showed the child to be entirely normal. He did not wet the bed, slept well and his bowels were regular. The mother insisted that he adored milk and that it agreed with him. I almost agreed with her, for he seemed to take care of it and it took care of him.

I could not arrive at a definite diagnosis in this case, and intended to send the case to a neurologist, but thought we could get along without it. We took the milk away entirely and put him on a placebo, and I told his mother to send him to the neighbors and see if he would not eat solid food with another child. Now she says that he offers no resistance to the new regime, swallows well and eats heartily.

The last child that I will tell you about is J.H.H., a boy, aged six years, who is one of four children. He had never been ill except for whooping-cough at two years. He wet the bed so frequently that it often had to be changed three or four times during the night. Various measures had been tried to correct this. He had been given atropin, his bed wetting had been timed and he had been waked half an hour earlier the next night, and he had been made to practice bladder control by stopping and starting micturition. He had been circumcised and the meatus had been cut. He had been offered a reward for a dry bed, and been put to bed with a dry dinner, but was never punished. He was constipated.

Physical examination showed a normal, healthy looking boy and there were no abnormal findings.

He ate heartily of meats, vegetables, and so forth, and was given very little sweets. He had a bowl of cereal with milk, two large glasses of milk, eggs and bacon for breakfast; chocolate milk about 11:00 a. m., milk at lunch, and since the dry dinner for a few days didn't work he had more milk at dinner. The mother bought six quarts of milk daily for the four children, and this boy drank over two quarts of milk a day. They were very careful of the diet for the children and very strict.

I advised that milk be eliminated entirely from the

diet, and within a short time the boy was all right and the bed wetting stopped. He afterward sent me a bouquet.

This mother thought milk was the best of all foods for children, and that is what the majority of mothers think, and the majority of physicians advise this without any limitation whatever. This is one of the little, simple things that we meet every day and that we all know, but that it does no harm to talk about once in a while. It is the little inconsequential things that annoy us in the practice of medicine. I do not believe that the constipated baby who is restless at night, the baby who is pot bellied, the baby who is slightly anemic, the baby who is drinking too much milk, fails to thrive because of an idiosyncrasy to milk. He is simply too full of a food insufficient in caloric value. He needs concentrated food and food which leaves more waste so as to relieve the constipation. His digestive capacity is all right. Constipation is a guarantee of good digestion; it means perfect waste. If the waste material was fermenting or putrid Nature would hurry it away. I do not think there is any failure on the part of the digestive apparatus that takes care of milk. These babies digest their milk, but are so full of milk that they do not want anything else and cannot get sufficient calories from milk alone.

1074 Madison Ave.

IMPORTANCE OF PROPER ANO-RECTAL EXAMINATION*

By F. M. DURHAM, M.D.,
Columbia, S. C.

The chief reason for a better understanding of ano-rectal pathology is that one person out of every six has some ano-rectal disease. Even with this staring us in the face, rectal diseases are less understood and more neglected by the general medical and surgical profession than disease in any other part of the body.

In a recent review of the records of 1,937 patients with cancer of the rectum and sigmoid in 1912 to 1922, Buie found that one out of every five had been treated elsewhere for hemorrhoids. "Rectal hemorrhages, or muco-purulent discharges, no matter how slight, should never be taken for granted as hemorrhoids, even though hemorrhoids are known to be present." Yet it is not the custom to make even a digital examination prior to a hemorrhoid operation, and a proctoscopic examination is almost an unknown quantity.

Should a physician continue to treat a supposedly minor disease of the uterus or breast, and not realize that it was a carcinoma until it became inoperable, he could offer no alibi. He would be criticized and censured by his fellow physicians, and justly so. Yet this same physician may treat a hemorrhoid until later he or some other physician discovers that it is an inoperable rectal cancer. For this mistake, he is not considered careless nor ignorant. Why is this change or difference of mental attitude when all of us know that cancer of long standing in any part of the body spells death? We are prone to forget that 60 per cent of the cancers of the colon are found in the rectum. The general practitioner is not supposed to be expert in the diagnosis of ano-rectal diseases, yet he should be alert as to the dangers which are apt to follow ignorance and procrastination.

Within the last year we have seen several patients who were suffering from diarrheas which were beyond medical control, yet not so much as a digital rectal examination had ever been made. When digital rectal examinations were made, the cause of the uncontrollable bowel action was found to be impacted fecal masses. Simply breaking up the fecal masses, completely and instantly cured the patients. Not one of the physicians who had previously treated any of these patients would have thought of treating a patient with a foul vaginal discharge without making a digital vaginal examination.

Once upon a time a patient was anesthetized and all ready for an operation for rectal carcinoma. Lo and behold, when the sphincter ani was dilated, a large fecal mass was discovered and broken up, and the supposed rectal cancer was immediately cured. A digital examination would have saved the poor patient a general anesthetic and several weeks of pain and mental anguish. Only a few weeks ago I saw a patient with a supposed rectal cancer which, after digital examination, proved to be a fecal mass.

Since the Spanish-American and World Wars amebic infection has increased a thousand-fold. Now every case of abdominal pain extending over a period of time when no assignable cause can be found should be looked upon with suspicion as being due to amebic infection. Never forget that mild amebic infection is very frequently found with constipation. These pa-

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tients are often amebic carriers. You have heard and read of punched ulcer, the oval ulcer, the round ulcer and the stellate ulcers of amebic dysentery, with healthy intervening rectal mucous membrane. This is all well and good, but if you have ever shot a rabbit or squirrel and looked on the shot holes on the inside of the skin, you have the most perfect imitation of amebic ulcers of the rectal mucosa.

The term mucous colitis means just about as much as the term catarrhal fever. Forget the term mucous colitis and look for the foci of infection either in the gut itself or in some other part of the body.

Twenty-five years ago practically all ano-rectal strictures were considered to be due to cancer or syphilis. I have often wondered why our teachers put syphilis down as a cause of ano-rectal stricture. I personally have never seen ano-rectal stricture yield one iota to anti-syphilitic treatment. Neither have I seen a stricture which I thought was due to tuberculosis or amebic infection. Most proctologists now believe that ano-rectal stricture is due to infection or trauma. One of the best things to keep indelibly stamped on your minds, however, is never to use force in an effort to dilate a fibrous, hard-feeling stricture. I am throwing this out as advice, as it looks very simple and I admit it may be tempting. It is a dangerous procedure and may cause you a great deal of embarrassment and the death of the patient.

Pain after bowel movement very frequently means anal fissure. Fissures are most often found in the posterior anal commissure, and as a rule are single. When they are multiple, it almost invariably means that the patient is syphilitic. Frequently, if the fissure is of long standing, a small skin fold will be found at the end of the fissure. This is called a sentinel pile. It is placed there as a sentinel purposely to tell the proctologist that he cannot cure this fissure by local application. I know of no lesion in proportion to its size that can produce so much pain and make so complete a physical and nervous wreck of a person as a fissure.

When a highly neurotic patient complaining of all manner of digestive disturbances consults you, and states that he takes purgatives, but that he never has a feeling of complete emptying of the bowel (although he goes to the toilet several times daily), do not pass him up as a neurotic. Take down your proctoscope, wipe off the dust, and make a thorough ano-rectal examination. You will probably find hypertrophied papillae. Clip off the hypertrophied papillae with a pair of scissors and the patient will gain in weight, stop taking purgatives, and the nervous system will become more stabilized. You will have a friend forever. Nearly every patient whom I have seen with large, hypertrophied anal papillae which, when touched with a swab of cotton, became instantly erectile, was a purgative-taking neurotic. His mind dwelt constantly on the "emptying of the colon." He frequently speaks of it as the "unfinished feeling."

Infected anal crypts are very frequently a source of focal infection. In hunting for foci of infection, do not give up until you have excluded infected anal crypts.

Hypertrophied anal sphincter always means ano-rectal infection, and as a rule these patients are sufferers from constipation and auto-intoxication. Many of these patients have gone the round from one physician to another for some form of digestive disturbance. A large per cent of them have lost their appendices in an effort to locate the cause of their digestive disturbances. Every person with an unknown cause of digestive disturbances existing over a considerable period of time should be proctoscoped. These patients are entitled to a careful examination for infected crypts, submucous channels and other local infections.

Protruding internal hemorrhoids over a long period of time often make a flabby, relaxed sphincter. If it is not due to this cause, a Wassermann should be made from the spinal fluid. A flabby sphincter is often associated with cord syphilis.

All internal hemorrhoids do not protrude nor bleed, yet they may be so large as to cause auto-intoxication and much local discomfort. It is impossible to diagnose a great majority of internal hemorrhoids by digital examination. No internal hemorrhoid, unless it has undergone fibrous change, can be felt by the examining finger. Unless they protrude, they must be seen with the aid of the anoscope. They are from Missouri: they have to be shown. Eighteen per cent of all women have backache, and internal hemorrhoids are quite a frequent cause of backache. The first symptom of rectal cancer may be backache.

I have seen edematous external hemorrhoids diagnosed as protrusions, and I know that attempts had been made to reduce them. How many physicians who graduated twenty-five years ago, as I did, when their diplomas were

handed them, could have given a clean-cut, differential diagnosis between an internal and an external hemorrhoid? How many physicians today could give a clean-cut differential diagnosis between internal and external hemorrhoids?

The great majority of the medical profession has never considered the diseases of the anus and rectum as having any bearing on general diagnoses, or of any local importance. But a few great men such as Matthews, Brinkerhodd, Tuttle and our own Jelks and Terrell have had a broader view of this subject. By their untiring efforts and burning of the midnight oil, proctology today is near as perfect a specialty as any of the other medical or surgical specialties. The greatest proof of this is the fast disappearance of the quack pill doctor. In a few more years they will be found only in our museums. Yet the ano-rectal region is the neglected region by a great majority of the medical and surgical profession.

Discussion follows paper of Dr. Gaston, page 383.

A PROCTOLOGIC VIEW OF CONSTIPATION*

By CECIL D. GASTON, M.D., F.A.C.S.,
Birmingham, Ala.

In this brief work I shall discuss constipation and obstipation jointly. Interference with normal defecation is viewed as constipation by laymen, and usually by the profession. More frequently, however, the condition is obstipation, and the etiology is often an overlooked, simple and remediable ano-rectal lesion.

This subject is approached with reluctance by an essayist. It is generally regarded as elementary and commonplace; it is not spectacular; it is not romantic. On the other hand, it involves many of the sins, omissions and commissions of the human race, and a fifteen-minute discussion will touch only its highlights.

Nothing, except prohibition, is more talked about. The discomfort that may attend the retention of feces, expressing itself with widely varying degrees of intensity in different individuals under varying circumstances, forms the subject of personal consideration by millions of persons. It has popularized faddists, high colonic "irrigators," cultists, quacks, laxative candies, chewing gums, and so on, *ad infinitum*. Few families fail to come under the spell of some favorite recommendation.

Why has America become a constipated nation? Evidently something is the matter.

(1) The act of defecation is an instance of man's failure to adapt himself to a changed environment. It has been regulated by man to suit his convenience and opportunities. Social inhibitions have conquered. In primitive times the impulse to defecate was obeyed instantly and constipation was not a problem. The infant, if properly nursed, usually defecates three or more times daily.

(2) The modern toilet is a factor in constipation. It was designed for comfort and ornamentation, and is a better reclining chair for perusal of the morning paper than for effective defecation. It prohibits the squatting posture. It is interesting to note that the children of Japan, China and India rarely have constipation. This is because the mother holds the child in a squatting posture to defecate. The adults continue this posture with advantage.

(3) Newspapers flash laxative advertisements and shelves in drug stores are laden with laxatives and purgatives which are taken in overwhelming quantities. Unfortunately, the busy physician frequently finds them the easiest way out.

A formed fecal mass is necessary for the exercise and dilatation of the external sphincter. Purgatives are the most common cause of hemorrhoids, a frequent factor in constipation. The overstimulation of purgatives creates reversed and leveled gradients of muscular rhythm, and later atonicity. Bacteria-laden liquid feces traumatize and irritate the frail sensitive zone at the ano-rectal junction, and pathologic change at that point is the most common cause of an irritable and tight external sphincter.

(4) Sandwich shops, quick lunch counters, "hygienic" food emporiums, and the like affect the public.

(5) American life and play are tense, with resulting chronic fatigue. We rush through our days; we crowd our hours; and we plunge heavily into a mad rush for pleasure. I am often reminded of the Irishman's plaintive remark, "How happy we'd be if it weren't for our pleasures."

(6) Improper, or inadequate exercise, is a well known cause of constipation.

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(7) Public drinking founts and public toilets in cities and institutions are frequently inadequate.

(8) False modesty may be a cause.

(9) Dental neglect is a contributing factor.

(10) The popular fad of high colonic irrigations with gallons of water, distending the colon, creating hyperemia, washing away Nature's intestinal lubricant, the mucus, and substituting liquid stools for a normal dilator is conducive to constipation.

(11) Frequent use of the antique, hard rubber enema tip with end aperture may produce a pathological ano-rectal condition.

(12) There is a prevalent belief that investigation of rectal lesions is distasteful, and in searching for the cause of constipation the rectum is often neglected. The writer believes pathological conditions in the ano-rectal zone are the chief causes of defective defecation.

These causes are only high spots, but in the opinion of the writer are the chief etiological factors, acting singly or jointly, primarily or secondarily, which impede the normal rhythm of defecation.

A brief review of the mechanics of defecation is timely. It has been shown by Alvarez that food goes down the bowel following a rhythmic gradient of muscular irritability. It normally takes four hours to pass from the pylorus to the cecum, and from fourteen to twenty hours to pass from the ileocecal valve to the recto-sigmoidal juncture. Stimulation of peristalsis in the duodenum results from the presence of acid chyme and a normal amount of carbon dioxid gas. The residue passes the ileocecal valve in liquid form. From the colon water is extracted, conserving the body water balance. The formed contents are finally deposited in the fecal reservoir, the pelvic colon. When ready for expulsion (this impulse normally is related to ingestion) the mass is sent into the rectum, an expulsive organ. It is fixed by the circular muscle fibres and the contractions of the abdominal muscles; the nerve terminals are stimulated; the external sphincter relaxes, if permitted by the will; the longitudinal muscle band everts the mucosa; the levator ani lifts the anal canal; and the individual is literally stripped over the fecal bolus.

If, for cause, this mechanism is out of sequence or inhibited, the fecal mass is sent back into the sigmoid; further water is extracted and inspissation of the mass results; a vicious circle is created; irregularity is bred; ano-rectal lesions develop, or existing ano-rectal abnormality is intensified; the external sphincter tightens and gradually abandons its voluntary control, and ineffective evacuation (constipation or obstipation) is established.

THE CURE

(1) *Diagnosis.*—I do not agree that an assumption of functional, habit or dietetic constipation is pardonable until all known causes of obstipation have been eliminated. I mention a tightly contracted or fibrosed external sphincter, fissure, cryptitis, hypertrophied papillae, polyps, irritable hemorrhoids, prolapse, stricture, hypertrophied and fibrosed rectal valves, tumors and new growths, foreign bodies, inflammatory lesions, adhesions with angulations, malformations of the intestinal tract, enteroptosis, lacerated perineum, displaced pelvic viscera and hypertrophied prostate.

I urge that every case of constipation be studied through the mediums of the barium enema and proctoscope. The opaque enema should be studied before and after the administration of an anti-spasmodic. An estimation of intestinal motility should be made. The carmine test is a practical method. Two 5 grain capsules of powdered carmine are given after breakfast. The patient is instructed to note the first and last appearance of the red discoloration. Normally the discoloration should disappear in from twenty-four to thirty-six hours. The examinations should be completed before any change is made in the patient's habits and diet, and before treatment is advised.

(2) The treatment must fit the patient. There is no one treatment any more than there is one class of constipation. The patient must be assured that the rectum, like the heart, tends to function against all odds and in all environments, and should be taught to heed carefully the post-prandial urge of the large bowel. It is customary to speak of "regular" habits of the bowels as though they should become an exception to functional adaptations in general, adjusting themselves to movements of the clock or the schedule of a business program. There is a physiologic moment as well as a convenient opportunity for defecation. The gastro-intestinal canal will give a significant hint not only to the clever experimenter, but even to the skillful observer; and one will often find a confidence in its normal functional power to be thoroughly justified.

(3) Prevention must start with infancy. In-

fants should be held in a squatting position with thighs flexed upon abdomen. With the modern toilet, a stool should be placed under the feet and the patient instructed to assume the squatting posture. Children especially should not be compelled to sit with dangling feet from high toilets. This is a public health problem and should be impressed upon school authorities.

(4) Diet will not be discussed in detail. It is a special field for the gastro-enterologist. I ask only your indulgence for a brief summary of my personal convictions. The writer condemns a routine diet list. In constipation, diet frequently depends on trial and error. I fear the pendulum has swung too far on the side of the extreme roughage or cellulose-containing diet. Like purgatives, the routine roughage diet has been many times a substitute for inadequate diagnosis and an easy way out. In many cases results are gained only upon a diet entirely smooth in structure.

As a general rule I place the patient upon a well balanced diet, especially high in fats, and leave the elimination of hurtful articles to his discretion. I do not advise a diet change until complete diagnostic endeavor has been completed. This includes investigation of past and present dietetic habits.

I commend the humble prune. When well cooked it is tasty, unirritating, and a most excellent bulk producer.

I oppose the indiscriminate use of bran. It is one of the most indigestible substances found in Nature, and was especially designed to carry seeds unchanged through the digestive tracts of the herbivora. I ask you to reflect upon the anatomy of that watershed between the somatic and splanic lymphatics, the linea dentata. That structure is weak, highly sensitive, and constantly exposed to trauma and infection. It has no greater foes than bran and purgatives; and constipation has no greater ally than a pathological condition at that juncture.

(4) Water is highly important. Sufficient must be drunk to supply the body balance and leave a residue in the colon. A minimum of eight to ten glasses daily at regular intervals (one glassful with each meal) is a good rule. I always advise one glassful before breakfast, preferably hot.

(5) *Medicinal Treatment.*—Purgatives have been discussed. In the opinion of the writer, mineral oil, not a cathartic, but a mechanical lubricant, is the only chemical of this class which should be given serious consideration. In the class of case reacting intensely to the smallest amount of fecal retention, or following operative removal of ano-rectal abnormality in connection with treatment, I begin the care with a daily dose of mineral oil, gradually reducing the dose, and withdrawing it entirely when evacuation appears established.

Tonics may be used as indicated. The writer has found extract of nux vomica or strychnin sulphate of value in cases of asthenic or run down individuals. In definitely spastic cases small doses of belladonna may be of advantage.

(6) *Enemas.*—The chronic giving of enemas never cured chronic constipation. Enemas were mentioned under etiology. Occasionally it is necessary to begin with a very small enema and use them over a short period of time.

When the act of defecation is incomplete, really an overflow, I have found McKenney's plan of advantage. It is briefly: the sudden injection into the rectum of a pint of clear cool water (65° F.) through a male catheter at a regular time each day. McKenney claims that this stimulates the sensitive region of the linea dentata, which he terms the "push-button of defecation." This injection is used daily for one week, then every other day for one week, then once weekly until defecation is established.

It is pointed out by Hirschman that soap suds enema should never be used. Soap suds, according to that author, cause the bowel to tear as they do the eye, and repeated irritation so induced will be productive of ano-rectal disease with resulting defective evacuation.

(7) Exercise, rest and play should fit each case as the judgment of the physician directs.

(8) Physical therapeutic measures are valuable in many cases if they merely keep the patient busy and hopeful and bring him back repeatedly under the influence and guidance of the physician. They keep him out of mischief and out of the hands of the quacks. One of our biggest mistakes in medicine today is that we have allowed incompetent quacks to monopolize these modes of treatment.

(9) Experience in proctology has convinced me that many sufferers from constipation are relieved only through proper attention to the rectum and colon, especially to the ano-rectal zone. I am convinced that the small intestine is seldom at fault.

Time is too short to dwell upon this important field as a causative factor in constipation.

There is much that is known of the function and behavior of the external sphincter and rectal musculature; there is much yet to be learned. I believe as more men enter earnestly and devotedly the field of proctology, that many problems connected with constipation hitherto unknown will be revealed.

An important mechanical procedure is the exercise of the rectal musculature and dilatation of the external sphincter by the ingenious device of Hirschman. Its technic is fully described in Dr. Hirschman's book, and in my hands has been a valuable aid to other agents.

CONCLUSIONS

(1) Constipation is a symptom. Its cause must be ascertained.

(2) Individualization of cases is imperative.

(3) Its relief demands the combined talents of the gastro-enterologist, roentgenologist and proctologist.

(4) If a patient does not possess reasonable intelligence and is unwilling to cooperate in treatment, the case should not be accepted.

(5) Treatment should not be begun until all pathological ano-rectal conditions are eliminated.

(6) For many years I had accepted constipation as Fate and, like Trudeau, believed: "The conquest of Fate is not by struggling against it, nor by trying to escape from it, but by acquiescence." I have abandoned that philosophy as it applies to constipation and believe that 85 per cent of cases can be cured, and many of the remaining 15 per cent improved, given an intelligent patient, a proper diagnosis, and a persistent physician.

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DISCUSSION (*Abstract*)

Papers of Dr. Durham and Dr. Gaston

Dr. John L. Jelks, Memphis, Tenn.—Some of you may not be familiar with the instruments that have been mentioned. I have brought a few to show you. I use this nose instrument more than any other in my office. If the patient is placed in the proctoscopic position, it permits one to have a view of the entire anal funnel. That leads up to the first rectal valve unless there are blocking hemorrhoids which may interfere. A thorough anal, rectal and sigmoid examination should always be made. In studying a case, you wish to know whether it is obstipation or constipation. That can be learned by simply examining the patient with a short proctoscope and then a longer one, examining every portion of the rectum in succession, and it can be determined whether the rectal valves are infected. In examining a patient I begin with the mouth and nose and then go down.

Dr. Hirschman's bulb instrument was mentioned. With this little instrument massaging the anal funnel, you can very effectually study and treat the rectum. If there are spasms you will find constipation or obstipation. If the colon is to be irrigated you must not over-distend it.

The most vicious thing that has ever been put on the American market is this cascade. I knew of a death which occurred from its use in a case of amebic dysentery. The omentum was torn off from an ulcer area by over-distension of the intestine and death followed. In irrigating the colon it is better to do so with the inflow and outflow tube which I invented, washing off the mucus and other material, not shooting it up but allowing it to flow out through the outflow tube.

If these cases could be seen earlier, there would be some hope of curing them. It has been my unfortunate experience to see many cases of rectal carcinoma that were hopeless that had been simple in the beginning. I operated upon one case that had had a previous operation for hemorrhoids only about two weeks before. He lived a year after proctectomy and died of carcinoma of the liver. In another case I was called to operate for a fistula and, as is my custom, I made a bimanual examination after the patient was anesthetized and found a cancer early enough to have the patient operated upon for cancer and she recovered.

Dr. Thomas Brockman, Greer, S. C.—In my treatment of 1,800 cases of rectal diseases I have found only four cancers of the rectum and none of them gave a history of hemorrhoids. I had always had the impression that hemorrhoids were likely to terminate in carcinoma if untreated.

In regard to rectal stricture's having received no benefit from anti-syphilitic treatment, in primary ulcer I think anti-syphilitic treatment is very beneficial. With a persistent dilatation of the spincter muscle, we can often prevent a rectal stricture, and that is the only way we can prevent it.

Dr. Jelks has shown a small nasal bivalve. It is a very ingenious little instrument that we could all use to advantage. Many times the finger cannot be introduced into a patient with an anal ulcer. The external sphincter is contracted, and any effort at examination brings about so much pain and discomfort that we drive the patient off. This little instrument will allow us to make a proper examination.

Dr. N. H. Palmer, New Orleans, La.—Physio-therapy

as an aid to our standard or orthodox forms of treatment is very valuable. We have in it an adjunct which has been in the hands of quacks, but which the medical profession is now beginning to adopt. Among the useful procedures for the treatment of rectal conditions are the electro-desiccation of hemorrhoids and the use of the Moss wave in producing intestinal peristalsis and overcoming atony. By properly combining medicine, surgery and physio-therapy, we shall accomplish much better results.

Dr. Durham (*closing*).—Cancer of the rectum followed neglected hemorrhoids in a patient of mine when I first began the practice of medicine. I have always regretted this.

I have given all of my patients with stricture of the rectum, anti-syphilitic treatment. Yet, so far as I can see, they have derived no benefit from it.

Dr. Gaston (*closing*).—We are not giving enough thought to that peculiarly and marvelously functioning external sphincter muscle and rectal musculature when we are confronted by the problem of constipation. I heard the reading of a splendid paper by a distinguished American gastro-enterologist on the subject of intestinal stasis. He presented many lantern slides showing kinks, angulations, carcinoma, pelvic tumors and inflammatory conditions, emphasizing the role played by pathological conditions of the colon in many cases of so-called constipation. When he reached the recto-sigmoidal juncture he stopped. I have largely dealt with the problem today from there down, and hope that I have directed your thought seriously to that important zone of etiology.

THE CONDUCT OF LABOR*†

By HOWARD F. KANE, A.B., M.D., F.A.C.S.,
Washington, D. C.

The aim of the practice of obstetrics is so to conduct pregnancy, labor and puerperium that neither mother nor child shall suffer permanent damage from the process of childbirth. This paper is limited to the discussion of procedures by which the morbidity and mortality of labor may be reduced. To accomplish this it is necessary to guard against maternal infection, laceration of soft parts, obstetrical shock, fetal asphyxia and damage to fetal structures.

It is only recently that obstetricians have begun to realize the importance of combating shock during labor. All of the elements causing surgical shock may be present: fear, pain, fatigue, traumatism, hemorrhage, and all may be markedly lessened if not wholly avoided by proper measures directed toward their prevention.

Confidence in the physician is the basis of the elimination of fear, and that should have been established during pregnancy. During labor, however, the frequent presence of the obstetrician in the first stage and his continuous presence throughout the second stage will give the patient a sense of safety which adds immeasurably to her peace of mind. The physician who spends the most time with his patients during labor is the one who will make the greatest efforts to relieve pain. Their pleadings for help and his natural desire to lessen suffering urge him to employ analgesics more frequently than he might if the diminishing of shock were the only consideration. Morphin in the first stage of labor is most valuable. Its effect seems to vary according to the time at which it is administered. If it is given very early, pains may be stopped entirely for several hours. The drug should be withheld, therefore, until the contractions are regular, strong, fairly frequent and definitely painful. The desired result, and the one most frequently observed, is a lengthening of the intervals between pains, drowsiness or sleep during these periods, and a diminishing of the severity of the pains. This apparent "slowing up" of labor does not actually retard its progress, even though the contractions stop entirely for an hour or so. The rest gives added strength to the uterin muscles and the morphin seems to render the cervix softer and more easily dilated. The effect of morphin on the uterin muscle may be analogous to its action in auricular fibrillation. By inhibiting the rapid incomplete impulses the regular, slow, full contractions are undisturbed. When given after the cervix is completely effaced and more than two-thirds dilated, morphin frequently fails to lessen the pain. On the other hand, contractions seem stronger and more frequent. This is probably due to the rapid dilatation of the softened cervix which stimulates the muscles in the body of the uterus. While this last mode of action does not relieve suffering, it lessens fatigue by definitely shortening labor. The dose of morphin should seldom be less than one-fourth of a grain, as a smaller dose is usually ineffectual.

The frequently encountered objection to the use of morphin because of fear of its effect upon the fetus is probably unwarranted. Theoretically a child born within three hours after the injection will be born while its respiratory centers are depressed. Actually asphyxia is extremely rare, and can usually be accounted for by some other condition, such as toxemia or compression of the head.

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†From the Department of Obstetrics, George Washington University.

The synergistic analgesia of Gwathmey has been somewhat disappointing in the hands of the writer. The combination of magnesium sulphate with morphin may possibly have lengthened the period of action of the drug. After observation of about 200 cases in comparison with a larger number in which magnesium sulphate was not used, the conclusion was that the combination was very slightly more effective than morphin alone. The rectal injection of ether, alcohol, olive oil and quinin has proved useful in many cases, but it has been found to be rather unreliable. If administered too soon, the effect is gone before labor is ended. If given too late, the patient has suffered much pain that she should have been spared. It does not always produce analgesia, sometimes induces anesthesia, and not infrequently results in marked excitement of the patient. Should a general anesthetic be desired for delivery, one would hesitate to employ ether in addition to the amount already being absorbed by the patient.

For the second stage of labor, ethylene properly administered gives almost ideal results. In 1926 the writer, in collaboration with Kreiselman, published a preliminary report of eighty-five cases of ethylene analgesia. In that series relief of pain was absolute in 84 per cent, and nearly so in 13 per cent. Failure to secure analgesia occurred in 3 per cent. The number of cases is now over 300, and with increased experience there have been no failures and very few partial successes. Lack of cooperation on the part of the patient is occasionally encountered, but complete analgesia with anesthesia during delivery is practically always obtained. In fact, patients are now definitely promised a painless second stage. No ill effects on mother or child have been noted, although the gas has been given intermittently for three, four and five hours. It has been stated that more bleeding occurs when ethylene is used, but in this series the increase, if any, was not noticeable. The second stage of labor is definitely shortened, as the patient, in the absence of pain, will use her voluntary expulsive forces to the limit.

Success in the obstetrical use of ethylene depends upon the skill of the anesthetist and upon the type of apparatus used. It is almost essential that the gas machine be of the intermittent-flow type. In this series practically every complication of labor was encountered and ethylene seemed to be satisfactory in every type of delivery. In one case only was it necessary to add ether, a version, although in twenty-five other versions relaxation had been entirely sufficient. A mirror placed at the foot of the delivery table has been of great advantage in allowing the anesthetist to observe the progress of labor and administer the gas accordingly.

In primiparous labors when the dilatation of the cervix is slow, particularly when the head is in a posterior position, the most satisfactory mode of relieving pain has been by the use of a combination of methods. Morphin, with or without magnesium sulphate, is given as soon as the patient begins to complain. This is repeated once or twice at four-hour intervals. When the cervix will admit three fingertips, the rectal injection of Gwathmey is given. This usually makes the patient comfortable until full dilatation is accomplished when ethylene is started.

Several investigators have recently published the results of their observations on different methods of obtaining an aseptic operative field. Some years ago Lankford graphically called attention to the folly of scrubbing dirt from surrounding parts to the vulva and then pouring a mild antiseptic solution over it. In 1922 Johnston and Siddall showed that patients who were scrubbed had only slightly less fever than those who were entirely unprepared. Siddall, in 1925, found that the morbidity following preparation by scrubbing was 16.3 per cent, with no preparation 12.4 per cent, while with the use of iodin it was 3.9 per cent. Painting the skin with iodin has been popular for several years, although some have preferred picric acid as being less irritating. Recently mercurochrome has been coming into favor. Mayes and C. H. Davis, among others, have advocated its use.

During the past year the writer has employed the so-called "A. M. A." solution of acetone, mercurochrome and alcohol. The results have been entirely satisfactory from the point of view of antisepsis and no irritation of the skin has been noted. Scott and Hill recommend this mixture, having found that mercurochrome is a potent germicide, alcohol hastens drying and acetone disintegrates skin debris.

An important aid in maintaining asepsis is the practice of placing the patient upon a douche pan just before the head is delivered. This raises the hips from the table and allows the blood, amniotic fluid, urine and feces when present to drop into the pan. The patient is not lying in a pool of infected material which may wash the vulva and the hands of the attendant. This elevation of the hips is of great convenience

in controlling the birth of the head and shoulders and facilitates repair of the perineum.

For the fetus, the most dangerous portion of the entire pregnancy is the second stage of labor. The management of this stage often requires of the obstetrician his best judgment and greatest skill. Should the medical attendant be deficient in obstetrical training, or should the surroundings be such that the best of technic cannot be carried out, it is better that Nature be allowed to effect delivery if possible. An obstetrician in a hospital, however, can frequently aid Nature to the advantage of both the mother and the child, particularly in primiparous cases.

It seems to be generally agreed that a long second stage, with periods of little or no advancement of the head, is dangerous to the child. DeLee believes that "prolonged compression of the brain by the natural forces will cause as great damage as an imperfect operative delivery." Harper, discussing post-partum hemorrhage, points out the advantage of delivery by forceps before the uterin muscle is exhausted. Cornell believes that the second stage of labor should never be allowed to continue longer than one and one-half hours without progress, and seldom longer than two and one-half hours, even if there should be some advancement.

It is the practice of the writer to deliver by forceps practically all primiparae and such multiparae as have any appreciable delay in the second stage. In the majority of cases the application is made with the head on the perineum, often with the caput in sight. Frequently the head becomes arrested in the oblique diameter of the pelvis just before it reaches the perineum. In these cases, also, forceps are used. Posterior position of the occiput is so frequently the cause of second stage delay that it should be suspected whenever progress is not satisfactory. In nearly all of these cases rotation will occur spontaneously if given sufficient time. In view of the fetal trauma and maternal shock which result from the hours of ineffectual pressure, the writer performs manual rotation and forceps delivery in all cases as soon as the cervix has become fully dilated. In 300 "prophylactic forceps" cases reviewed in the preparation of this paper, no baby suffered injury except slight temporary facial paralysis in twelve instances.

While shortening the second stage often seems desirable, the first stage should not be tampered with, except in cases of emergency. A bag will hasten dilatation with the minimum amount of damage to the cervix, but it is doubtful that manual dilation is ever accomplished without laceration. Stretching the cervix with the hand is unphysiological as the upward retraction of the muscle fibres is not utilized. Except in cases of prolapsed cord or accidental hemorrhage, the fetus is in no danger during the first stage and maternal comfort can be promoted by the use of narcotics. The practice of allowing or urging a patient to strain and "bear down" prior to full dilatation is a source of shock. It increases pain and fatigue, probably causes lacerations of the cervix, and does not hasten labor.

The practice of cutting the perineum is recommended in the interests of both mother and child. The fetal head is spared the pressure exerted in overcoming the resistance of the pelvic floor; the perineum is neither overstretched nor irregularly torn. In many instances it is possible to deliver a primipara of a child of average size with no apparent laceration. Examination of these patients six or eight weeks post-partum will regularly reveal some degree of cystocele and frequently a rectocele. In fact, a small tear is probably to be preferred to a supposedly intact perineum. When there is a tear, the damage is evident and is repaired. Perineotomy should not be employed as an emergency measure to prevent laceration already impending; it should be performed when the perineum first begins to bulge before overstretching has taken place.

The perineotomy incision may be made in the midline or diagonally at one or both sides. In the majority of cases the median perineotomy is to be preferred. It divides the perineum in the median raphe rather than across muscles. It is easier to repair and the result is symmetrical. The incision should be carried to the spinchter muscle, which can usually be seen arching across the depth of the wound. Three buried sutures of twenty-day chromic catgut no. 2 will close the usual perineotomy. These should enter beneath the skin, sweep widely to the levator muscle, emerge beneath the vaginal mucosa, enter under the mucosa of the opposite side, catch that levator and emerge beneath the skin. A buried suture from the muco-cutaneous juncture carried just under the mucosa to the deep angle of the vaginal incision and back under the opposite side closes the vaginal portion of the wound. The skin is approximated by a subcuticular suture which starts at the rectal end of the incision. Non-absorbable suture material is not used, as the exposed ends cannot be protected against infection which may be transmitted into the wound. Care must be taken that all the

chromic sutures are buried. Exposure to lochia, perspiration and urine will cause destruction of the sutures before healing has taken place. A perineorrhaphy based on similar principles was described by Wells before this Section in 1926. Although in a few instances, follow-up examination six weeks post-partum has revealed slight rectoceles, in practically every case the perineum looks and feels like that of a nullipara.

There are some objections to the median perineotomy. Frequently the patients complain of pain for six or eight days. This can be avoided to some extent by care in not drawing the sutures too tight. Hot compresses will usually give relief. When a perineum has once been cut, the operation should be repeated in succeeding labors. In this series it was done twice on 36 patients, three times on 11, and four times on three. Healing was perfect in all cases. All of the advocates of this procedure admit that lacerations of the sphincter ani through extension of the incision are not infrequent. It occurred fourteen times in the 400 cases reviewed. Pomeroy and Smith mentioned this complication and neither expressed great concern, reporting successful repair in every case. While the writer has had excellent results in his fourteen complete tears, he regards the laceration of the sphincter ani as an accident which is not to be taken lightly. To avoid this, it has been suggested that the sphincter be dilated immediately before delivery. This makes a tear less likely and its repair less difficult, but it obviously endangers aseptic technic. Probably a better precaution against third degree lacerations is the employment of the medio-lateral perineotomy in certain cases. When the perineum is short, or the pelvic angle is acute, this should be the operation of choice. While the oblique incision involves a part of the levator muscle and fascia and frequently does not result in a nulliparous outlet, it will protect the sphincter.

In order to give the patient the benefit of the various methods of analgesia and of a shortened second stage, information regarding the progress of labor is necessary from time to time. Much can be learned from abdominal examination, but frequently this is insufficient. The danger of infection by careless vaginal examinations cannot be overestimated and to lessen this danger, rectal palpation has been widely advocated. For the most part the proponents of the rectal examination have failed to point out that this procedure is not without possibilities of harm. Reis, however, in an analysis of 1,000 cases found that there was practically no difference in the percentage of febrile cases between those examined by vagina and those examined by rectum. Sellheim points out the danger of contaminating the field with anaerobic organisms. There is also damaging trauma to the rectal mucosa. In vaginal examinations it is true that bacteria may be carried into the cervix by the passage of the fingers through the vagina. The wall of the vagina, which contaminates the fingers, is pushed through the cervix and rubbed over the presenting part in rectal examinations. It would seem, therefore, that whereas rectal palpation is by no means a harmless procedure, and as the information gained thereby is far from being as accurate as that obtained by the fingers in the vagina, the latter method is not to be entirely supplanted by the former. Of course, vaginal examinations should be made only after the patient has been painted and draped, and the examiner's hands have been scrubbed and gloved. Examinations, vaginal or rectal, should be as few as possible as experience has shown that patients who have had no internal examinations of any kind are much less likely to have postpartum fever. The slight rise of temperature which is more frequent after examinations is inconsequential when compared with the benefits the patient derives from the procedures controlled by the knowledge gained. Practically all of the patients delivered by the writer have had one or more vaginal examinations during labor, and the temperature charts compare favorably with those of patients who were examined rectally, or not at all.

It is not sufficient to follow the progress of labor from the standpoint of the mother. The effect on the child should be noted by frequent examinations of fetal heart, especially during the second stage. Many a baby has been saved by quick delivery after a change in the rate or character of the heart-beat has been discovered.

The manner in which he conducts the third stage of labor is a good criterion of an obstetrician's ability. The proper management of this stage is elementary, but attention should be called to the danger of shock and uterin trauma in violent squeezing and pushing of the uterus. Many observers of wide experience advocate the giving of pituitrin as soon as the child is born. This is to shorten the third stage, lessen hemorrhage and help prevent after-pains. The writer prefers to use pituitrin only after the uterus has been entirely emptied. This fear of pituitrin in the third stage may be ungrounded, but as a consultant he is frequently called in cases of retained (not adherent) placenta, and

practically always he is told that pituitrin had been given. In his own cases this accident has very rarely occurred. Rucker has pointed out that hour-glass contraction of the uterus may follow the use of pituitrin.

The advocating of routine delivery with forceps and the cutting of every perineum invites criticism from those who take the word "obstetrician" literally. Before antiseptics were known and hospital facilities were so generally available, it was wise for the attendant to be "one who stands by." Nature will, if given time, effect delivery in 95 per cent of all cases, but often at the cost of permanent damage to the mother and dangerous trauma to her child.

The results obtained since the adoption of the methods described in this paper are entirely in accord with a statement by McPherson, one of many obstetricians of large experience who believe that intelligent and skillful intervention in the second stage of labor is good obstetrics and not "meddlesome midwifery." He says:

"In the average primipara, under suitable surroundings in the hands of a competent obstetrician with full anesthesia and proper technic, an easy low forceps where no pressure is applied by the blades, and which is preceded by an episiotomy just as the perineum is about to distend, offers a more satisfactory means of delivery than that of waiting for Nature to effect the birth."

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1801 Eye Street Northwest.

OBSTETRICAL EMERGENCIES IN THE HOME*

By EDWARD SPEIDEL, M.D., F.A.C.S.,
Louisville, Ky.

When an obstetrical emergency is treated in a maternity hospital it is surrounded with all of the safeguards and paraphernalia of a major operation; sterile dressings and instruments, two or more nurses, an interne and anesthetist to aid the attending obstetrician.

How, then, can one expect the physician alone in a home out in the country to conduct such an emergency?

An obstetrical emergency never is a one-man job. Even in the country no obstetrical emergency can or should be conducted alone. With two lives at stake it is easily on a par with a major surgical operation, and no one would have the temerity to undertake such a procedure single-handed. In all instances, since practically all physicians have automobiles, it should be possible to call another practitioner to assist in a difficult delivery. Even if there is a delay of one or two hours before he arrives, that time can be spent very profitably in getting everything ready for the delivery, sterilizing all necessary instruments, securing an abundance of hot and cold sterile water, and preparation for the resuscitation of an asphyxiated infant. Even if the emergency is a desperate one, more will be accomplished by a careful planning of the method to be pursued than by haphazard immediate action. Practically all emergencies in obstetrics require surgical anesthesia and the assisting physician, in addition to his counsel and advice, may be depended upon to attend to that feature of the situation at least.

When such an emergency is conducted in the home, hospital conditions should be simulated as closely as possible. No attempt should be

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made to conduct the procedures upon a sagging bed. The patient should always be transported to the kitchen, where the ordinary short kitchen table and the linoleum floor covering, the sink with hot and cold water, make the almost ideal obstetrical operating room. The kitchen table is ideal for obstetrical procedures because it just about accommodates the head and trunk of the ordinary person, bringing the buttocks to the lower end of the table. The table should be padded with a double blanket, a square of oil cloth hanging over the lower end, and a clean sheet over all. The absence of stirrups is an advantage, as it is better to have the legs of the patient held by members of the family so that they can be raised or lowered to meet the conditions that arise in the delivery.

It does not take a very extensive equipment to conduct the obstetrical emergencies that can be taken care of in private homes, and it is the duty of every one practicing such obstetrics to be properly equipped and to carry that equipment constantly with him. The rear compartment of any automobile will easily contain the necessary paraphernalia and the physician will feel greatly relieved to know that he has easy access to everything that may be needed. The most essential part of the equipment is a sterilizer large enough to contain the obstetrical forceps, for it is difficult in the ordinary household to find a kitchen utensil that is proper for that purpose. Rubber gloves can be bought for $3.50 a dozen pairs, so there is little excuse if the physician is short of them. Gauze should be carried in one-yard sterile packages. Such a strip cut down the middle to within two inches of the lower end makes a two-yard length and just the proper width for full-term uterine packing. Cotton should be carried in one-ounce sealed packages.

The proper preparation of the patient is the next consideration. There is little reason in supposing that difficult obstetrical procedures can be carried out safely in the home unless the same precautions are taken that are customary in obstetrical hospitals. What is gained if you deliver a woman safely only to have her die later of some complication due to neglect of these ordinary precautions? Fortunately the safety razor has made the preparation of the patient safe and simple, and there should no longer be any discussion as to whether clipping or shaving should be done preparatory to the extensive vaginal manipulations necessary in obstetrical operations. Thorough soap and water cleansing should follow shaving.

An accurate diagnosis of the existing situation is essential to the solution of every obstetrical emergency. The position and presentation of the fetus should be determined by abdominal palpation and auscultation.

A pelvimeter should be in every physician's equipment. The interspinous measurement is about 26 cm., the intercristal 29, the bitrochanteric 32, and the external conjugate 20. With these measurements, if one cannot touch the promontory of the sacrum with two fingers pushed up into the vagina, any abnormality of the pelvis may be eliminated. If the knuckles of a small closed fist can be pushed between the tuberosities of the ischium, then one knows in addition that the outlet of the pelvis is roomy enough for delivery.

Obstetricians no longer depend upon the sutures and fontanelles to make a diagnosis of presentation and position. The location of the back and fetal parts as determined by abdominal palpation gives more accurate information.

The auscultation and location of the fetal heart then aids in confirming that diagnosis. It is only necessary to listen in four areas to locate the fetal heart in all head presentations: in a line from the umbilicus to the anterior-superior spine of the ischium on the right and left side, and in the right and left flank behind that line. The physician may not make his diagnosis to his satisfaction at the first examination. However, he should listen to the fetal heart every hour at least during a long labor, and this will give him abundant opportunity to improve his knowledge in succeeding examinations. With the knowledge gained from these investigations, proper corrective measures can be applied if there seems to be an obstacle to delivery.

In the great majority of obstetrical emergencies, forceps and version are the two procedures that must be relied upon, and it is well, therefore, thoroughly to appreciate their limitations and their indications.

In the discussion of home obstetrics it is useless to mention high forceps operations. When the head does not descend to mid-pelvis, it is generally the indication of a serious disproportion either on the part of the mother's pelvis or the head of the fetus, and in consequence even expert obstetricians in well equipped maternity hospitals no longer attempt high forceps operations. This limits the procedure to mid and low forceps with the head either on a level with the spines of the ischium or on the floor of the pelvis. In the mid-pelvis operation the long

diameter of the head must be in one of the oblique diameters of the pelvis, and traction must at first be downward and backward in that diameter, and then, as rotation occurs, forward and upward.

Previous catheterization of the bladder and an ironing out of the perineum should precede each forceps extraction. Accurate diagnosis of the position is necessary. Even if the fontanelles and sutures can be palpated it is best to double-check that with the posterior ear. Naturally, if a posterior position is encountered, manual or forceps rotation must precede the traction. If the head is in transverse position, then manual rotation into one of the oblique diameters is the proper procedure. In the low operation the long diameter of the head is generally in the antero-posterior diameter of the outlet, but it is best to confirm this by the sagittal suture or by the position of the ear if a caput succedaneum covers the top of the head. A serious laceration can be avoided if the narrowest diameter of the head is thus drawn through the outlet. It is well also to exchange the long forceps for a pair of thin-bladed short forceps when the head crowns the vulva for the final extraction. The position of the patient's legs will at times have a favorable influence upon the progress of delivery. The Walcher position, readily assumed by allowing the legs to hang down toward the floor, will often materially aid delivery when the head is still high in the pelvis by a slight increase in the diameters at the inlet and a change in the pelvic axis. When the head is about to be born, laceration of the perineum can be prevented or minimized by having the flexed legs in line with the body instead of in the lithotomy position.

Two very important points should be borne in mind when doing a version. The patient should be under deep surgical anesthesia and the cervix should be not only fully dilated, but retracted. With surgical anesthesia there is little or no danger of rupture of the uterus, even if the bag of waters has ruptured a long time before the operation. If the cervix is not fully dilated, then the shoulders or after-coming head will be caught by the contracting cervix and the delay in extraction will be sufficient to endanger the life of the child. If a version must be performed without full dilatation of the cervix, as is sometimes the case in transverse presentations and placenta previa, then the delivery of the fetus, after a leg has been brought out of the vulva, must be left entirely to the expulsive efforts of nature.

Although every physician is supposed to be able to take care of maternity cases, it should be conceded that the one with a small hand is especially endowed by nature to do a version; and when that important procedure becomes necessary the physician with the big fist should yield to his more effeminate colleague.

Elbow length rubber gloves and an abundance of liquid green soap are additional valuable aids in doing a version.

Occipito-posterior cases will probably cause more worry and anxiety than any other presentations. It is most important with this condition to know that you have a posterior position, to realize that it will take twice as long for delivery as an anterior, and then to act accordingly. Postural methods will sometimes correct this abnormality. If the position is diagnosed before labor, then the knee chest position assumed for ten minutes three times daily may bring about an anterior position at labor. During the first stage and after full dilatation, anterior rotation will at least be favored by allowing the patient to lie on the side opposite to the back of the fetus.

It is well to remember that a left occipito-anterior in a pelvis with proper measurements is sure to show rapid and distinct progress under a number of hours of good, steady labor pains. In the absence of such progress investigation will generally show an error in diagnosis and that a posterior position is the cause of the delay.

Too early alleviation of pain is often the cause of trouble in this condition. Contractions must be well established and must have continued for a number of hours before a hypodermic of morphin is given to secure much needed rest and a continuance of labor under the analgesia. In many instances the head will be found on the perineum and rotated when the effect of the morphin has worn off. If not, then a persistent occipito-posterior confronts one. While a colleague anesthetizes the patient, the full-gloved hand should be inserted into the vagina, the diagnosis confirmed either by feeling the posterior ear, or, if necessary, going still higher and noticing that the face is pointing forward. Then either a manual rotation or a forceps rotation should result in an easy delivery.

If the very unusual face presentation is encountered, then be it with chin anterior or posterior, the safest procedure after full dilatation should be a carefully-performed version.

In these cases again a great deal of delay must be expected in the first stage of labor.

A breech presentation is readily diagnosed when the nurse tells you that meconium is escaping from the vulva of the mother. In other words, we have all slipped up on that presentation. There again a very slow first stage should be expected. If there is lack of progress after full dilatation and good pains, then a frank breech with legs extended should be expected, and under surgical anesthesia one of the extended legs must be brought down before further progress can be expected in the labor. There should be no hurry then in the delivery of the after-coming shoulders and head, as more fetal deaths have been caused by injuries due to haste at this stage than by asphyxia. The head should be pushed out by suprapubic pressure rather than by traction on the neck, as was formerly taught.

Transverse presentations generally diagnose themselves, with ruptured membranes and a hand and perhaps even the umbilical cord prolapsed into the vagina. Fortunately this complication occurs most often in multiparae who have had a number of children in such rapid succession that the vaginal passages are large and roomy. In addition the single leg that it is necessary to bring down to deliver by version is just over the entrance to the pelvis. Under deep surgical anesthesia and with thorough soap and water cleansing of the vagina and prolapsed arm, a safe delivery should be effected without danger of rupturing the uterus or infecting the patient.

Placenta previa makes its own diagnosis. There is a sudden profuse hemorrhage without pain in a woman in the latter months of pregnancy. The degree of encroachment of the placenta matters little in the general treatment of the case. The period of gestation and whether we are dealing with a primipara or multipara are more important. There generally is a considerable interval between the first hemorrhage and a succeeding one, consequently great haste in delivery is rarely necessary. Nothing further can be gained by a vaginal examination, and with it there is great danger of precipitating a second hemorrhage and introducing infection into the cervical canal. This is one complication that should, if at all possible, have the benefit of hospital treatment to insure the life of the mother and baby. If the vagina is firmly packed and the pregnant uterus strapped down firmly on the tampon with two-inch adhesive strips on the abdomen from above the fundus to the symphysis pubis, the patient can be transported for miles in safety and receive the benefits of blood transfusion and the extreme measures that must at times be resorted to in the conduct of this condition. In the home, resort must be had largely to the rupture of the membranes with the escape of a considerable quantity of the liquor amnii and the administration of three minim doses of pituitrin to stimulate and keep up continuous contractions until the uterine contents are expelled.

The prognosis for the fetus is poor in such circumstances, but the mother should be carried through the procedure safely. Rubber dilating bags of the Vorrhees type are a comparatively inexpensive addition to the obstetrical equipment, and with their introduction into the uterus in such cases, placenta previa can be handled with greater security for both the mother and the child. It must be remembered, however, that a prompt version is generally necessary after the expulsion of the bag with probable manual removal of the placenta to prevent postpartum hemorrhage, and adequate preparations must be made for this before such a method is attempted in the home.

We still have eclampsia with us, and it generally comes like a thunder bolt out of a clear sky. It is astonishing to learn of the success that many physicians in the country have with veratrum viride in the treatment of this condition, especially as they do not seem to follow a definite plan of dosage and the drug has been discarded by most obstetrical authorities.

The modern treatment of eclampsia can readily be carried out in the home, especially if one can have the benefit of nitrous oxide-oxygen anesthesia. An initial hypodermic of one-half grain morphin with an intra-muscular injection of 15 c. c. of 25 per cent sterile magnesium sulphate should check the convulsions temporarily and allow taking the blood pressure, abdominal palpation and auscultation, vaginal examination and catheterization all under anesthesia, without unduly disturbing the patient or precipitating further convulsions. With the information thus gained further procedures, colonic irrigation, gastric lavage and delivery if the patient is far enough advanced in labor, can be practiced in proper succession. Any further convulsions are controlled by the repeated administration of one-eighth to one-fourth grain of morphin with 15 c. c. of 25 per cent magnesium sulphate as before. High blood pressure can be

controlled by rupture of the membranes if the patient is in labor or by venesection of 500 c. c. of blood. Ampoules of sterile magnesium sulphate should be carried at all times in readiness for the case of eclampsia that may perhaps not be seen in a year. These ampoules are comparatively inexpensive and in their sealed containers will not deteriorate.

In prolapse of the umbilical cord the patient should be carried to the padded kitchen table at once with knees over the end of the table and raised into the Trendelenburg position. This removes the pressure of the prolapsed cord and the method of delivery can be carefully planned. If the condition occurs with a breech or transverse presentation, then the usual delivery with the patient's hips elevated will suffice. If one is dealing with a head presentation, the condition becomes more serious. Fortunately prolapse occurs most frequently in multiparae with more or less complete dilatation of the cervix. Under anesthesia and with proper soap and water cleansing of the birth canal a version should be performed and extraction completed with the patient in the Trendelenburg position. This course should be pursued even if pulsations in the cord have apparently ceased and the fetal heart sounds cannot be heard, because resuscitation of the asphyxiated infant is at times possible after such delivery.

If the patient is a multipara with relaxed outlet and with the head low or on the perineum, then a rapid forceps delivery may at times be successful. The patient, however, should be kept in the Trendelenburg position until everything is ready and the first forceps tractions made in that position.

Retained placenta will be found occasionally, largely because of our tendency to squeeze and bruise the uterus before placental separation has taken place naturally. After many years of experience with the various short cuts to terminating the third stage of labor advocated from time to time, one finally learns to wait for the natural separation of the placenta before attempting its expulsion. There are two signs that will definitely indicate when this occurs: the hardening and elongation of the uterus within fifteen to twenty minutes after the birth of the child as explained by Williams, or the descent of the umbilical cord as determined by a tape tied around it close up to the vulva just after the end of the second stage of labor, and the position of the ligature three or four inches from the vulva after separation has occurred. It is my custom to wait twenty minutes, simply laying the hand on the abdomen above the fundus to guard against any sudden relaxation, then to attempt placental expression. If this is unsuccessful 1 c. c. of obstetrical pituitrin is injected and the attempt repeated as soon as the effect of the pituitrin manifests itself. If this fails, a second attempt is made in another twenty minutes supplemented again by pituitrin, and a third attempt at the same interval.

If all these fail, then preparations should be made for a manual removal of the placenta under the most rigid asepsis. The patient should be anesthetized, the vulva and vagina thoroughly scrubbed with soap and water and irrigated, fresh rubber gloves, elbow length preferred, lubricated with sterile soap should be put on and preparations should be ready for a hot intra-uterin douche and sterile gauze packing to prevent a post-partum hemorrhage. Before introducing the gloved hand into the uterus, a last attempt should be made with the patient under anesthesia to express the placenta by the Crede method. Failing in this, there is no valid reason for further delay, and manual removal should be practiced followed by hot intra-uterine irrigation and gauze packing as a safeguard against a possible post-partum hemorrhage.

Post-partum hemorrhage with the placenta still in the uterus should be controlled with the measures suggested for retained placenta. If it is due to uterin atony, then the uterus should be quickly grasped between the relaxed recti muscles and pulled upward and then backward against the lumbar spine. This, with a hypodermic of pituitrin and one of ergot, supplemented in some instances by compression of the abdominal aorta, should control the usual situation. Hot intra-uterin douching and uterin gauze packing will be the final resort.

I am well aware that I am treading upon dangerous ground when I advocate so early an invasion of the uterus for retained placenta, but it is fair to assume that a uterus that will not contract and expel a placenta in one and a half to two hours even with the added stimulation of repeated doses of pituitrin is very apt to relax suddenly and necessitate a precipitate invasion of the uterus to control a serious post-partum hemorrhage. It seems more rational, therefore, to set a reasonable time for placental expulsion then to make a careful preparation to invade the uterus as described and with such precautions avoid a possible infection.

The majority of physicians practicing at present having graduated in the last twenty-five years have been thoroughly instructed in surgical asepsis. I have seen splendid obstetrical work done by such practitioners in various homes in the city and in the country, and I am satisfied that they can intelligently, safely and successfully carry out the suggestions embodied in this paper.

717 Francis Building.

DISCUSSION (*Abstract*)

Papers of Dr. Kane and Dr. Spiedel

Dr. J. S. Ayres, Memphis, Tenn.—We were taught in school that obstetrics is the science and art of midwifery. After leaving school we go to medical conventions and are filled up with science, but we get very little art. We all know more science than we have art to apply, and that is especially true of the active branches of surgery and medicine, of obstetrics, and especially of pediatrics. We know more obstetrics than we have the skill to apply. When we deliver a woman and leave her with a badly relaxed or lacerated perineum, with a retroverted uterus, or any other after-effect; if the baby is still-born or dies a few minutes after delivery, it avails us very little to have gone through nine months of the most skilful prenatal care.

There is only one thing in the paper that my own limited experience would lead me to take issue with, and that is the effect of morphin near the time of delivery. We need not have thousands of cases to find out that morphin given near the time of delivery sometimes has disastrous effects upon the unborn child. All of us who have in the past stood by and watched a cesarean section done by a general surgeon finally reach the point where we would not go in to see a section done, because we are never able to see the surgeon finish the section. He says, "Doctor will you resuscitate the baby," and we have to swing the baby to one side, or watch the pupils and listen to the pulse to know whether there is breathing.

It is common now to use a preliminary hypodermic for the operation. Olive oil has been a great help to me. Dizziness sometimes occurs because the anesthetic is deeper than we desire. That is very easily corrected by putting a tube into the rectum and washing out the anesthetic. It is surprising how quickly the patient will come out from under ether when this is done.

Dr. Jerre Watson, Anniston, Ala.—The majority of obstetrical fatalities unfortunately are not obstetric emergencies; they are the apparently more simple cases that are handled at home, but subsequently develop pelvic infection. These women think, because of economic or family conditions, that they must be handled in the home instead of the hospital.

We ought to make our technic in the home as nearly parallel to that used in the hospital as possible. I would impress upon the attending physician the importance of shaving the vulva and using an antiseptic solution in the vagina. I believe those of us who operate in the home ought to carry with us continuously a safety razor that the perineal vulva may be shaved before making our preliminary examination. After having done this, the vulva and the lower portion of the vagina should be treated with an antiseptic solution, perhaps with mercurochrome solution. I employ a 4 per cent solution.

We render the greatest service to the women we are called upon to deliver by carrying into the home a scientific, antiseptic technic.

I urge my patients to have their sheets and gowns and all of the properties used for the confinement sterilized: to bring these things to my office where my attendant properly wraps and sterilizes them. They are then returned to the patient's home where they will be ready for use at the confinement.

By the use of the safety razor, the sterilized pack, the antiseptic solution, rubber gloves and other factors that have been brought to our attention this morning, we are able to have in the home a technic that is certainly not subject to violent criticism.

We can render the greatest service to the parturient woman in our present-day economic development by making the application of hygienic rules in our home confinements as extensive as possible.

Dr. E. Lee Dorsett, St. Louis, Mo.—I heartily agree with Dr. Kane as to the anesthetic in obstetrics.

Dr. Spiedel mentioned the use of a proper table. The average kitchen table is better to deliver a patient upon than the average hospital table. I have entirely discarded the use of stirrups in delivering patients. I bring my patient down over the edge of the table where the pelvis can be dropped and thereby relieve the strain on the perineum, just as I do when I put a patient in the extreme lithotomy position.

Dr. Spiedel mentioned Version. Potter has well taught us how to do a version, and the difficulty in version is not so much in the turning but in the extraction of the after-coming arms and head. I think in the past the reason we have lost so many babies by version has been that we have not done our extraction in the proper direction, and that we have turned the baby upward and produced extreme flexion of the head instead of keeping the body down and exerting pressure with the fingers in the mouth and suprapubic pressure on the occiput.

In regard to eclampsia, since we originated in 1924 the intramuscular injections of magnesium sulphate, we have controlled the convulsions in ninety-three eclampsia cases by injection of a 25 per cent solution. Our mortality today is 11.5 per cent, fetal mortality 27 per cent. Of course, in that we counted the babies which were dead at the beginning of the operation. We have found that the so-called dangers of magnesium sulphate have been greatly exaggerated. In several cases we have used as high as 150 to 200 c.c. in twenty-four hours. We have pushed that practically to the limit. Now we give the injections as long as the patient is having convulsions, but no longer. In one or two cases where we pushed it to the limit we found some embarrassment in the respiratory function of the patient, which was counteracted by calcium chlorid given intravenously. We do not give magnesium sulphate either intravenously or intraspinally. We get the effect entirely too quickly, and we feel it is a little more dangerous than to use intramuscular injections. In our first cases we gave no morphin; we were trying to see if we could carry the case along without the use of any other drug than magnesium sulphate. We were fairly

successful, but the restlessness of the patients was a little better controlled with morphin. There is no question that if we get a case of eclampsia early we can practically control the convulsions by the use of magnesium sulphate.

Dr. E. J. Brown, Stanford, Ky.—It is shocking to know that out of twenty civilized countries there is only one that has a higher maternal mortality than ours. We believe the rush and hurry, which is characteristic of the American people, to be the most outstanding cause. Pituitary extract and the forceps are a blessing in the hands of the cautious and conservative, but instruments of destruction in the hands of the reckless. Why has cesarean section been so popular in this country? It is the greatest blessing of all operations when indicated. Upon thousands of women with fair pelvic diameters who were never permitted the benefit of a trial labor, this mutilating operation has been performed. Rush and hurry are the only explanation for this country's using the operation many times more than other countries. A physician or obstetrician who accepts charge of the prenatal and lying-in stages of pregnancy should not permit business or pleasure to interfere with any and all the duties to that expectant mother, whether it takes many hours or few, in rain or sunshine, day or night.

Dr. Basil M. Taylor, Portland, Ind.—It is safe to say that not more than ten in one hundred obstetric cases are taken care of properly. Obstetrics is a branch of surgery, and if we did surgery as carelessly as we do obstetrics, the mortality rate would make surgery a matter of past history. There would be no surgery done. Obstetricians do about ten cases in the average hundred cases of obstetrics, and the ninety are done by general practitioners out in the hills, hollows, cross-roads and small towns, and even in the cities. It is from the ninety that we get the thirty thousand dead mothers and the hundred thousand dead babies and the millions of crippled babies and mothers each year Obstetrics is a classical term and carries with it a definite mental and physical equipment. The man who does obstetrics shaves and irrigates the vulva, makes his examinations by sight and delivers the baby with the sheets draped so he can see what he is doing. The men who do not shave and irrigate the vulva and who make the examinations under cover and deliver the babies under cover do not do obstetrics. They do baby cases and granny sprees, In hospitals it is easy to do obstetrics. The nurses prepare the patients, and they will make one do obstetrics.

Three things are required for obstetrics in the homes: common sense, pride and equipment, with a little determination thrown in. There is no excuse for poor obstetrics. A good safety razor can be bought with a tube of soap thrown in at a special sale for thirty-five cents, a nail brush and a cake of soap for a quarter, and a douche pan to put under the patient for vulval irrigation can be bought for one dollar and a half. With this outfit and the common sense and determination to use them, anyone can do good obstetrics in the home. Rubber gloves are fine, but will not save the patient any infection if they are passed into the vagina under the sheet or through the hair on an unshaved vulva.

Dr. Speidel said that obstetrical emergencies are not a one man's job. He is correct, but many isolated physicians have to make them a one man's job. I had the pleasure of practicing medicine many years in the hills of Kentucky, where most of my emergencies had to be my job: the only other available physician would have emergencies of his own.

Dr. Kane (closing).—I have been criticized more than once about the use of morphin. Some people in Washington say that I use it too much, and I was not surprised that Dr. Ayers mentioned it; but I can honestly say that I do not know of a case in which the baby has been jeopardized by morphin.

In cesarean section I have thought that perhaps the apnea in which the baby is born is due to the fact that unless a long labor has preceded the operation, the respiratory centers have not been stimulated by carbon dioxide which accumulates while the uterus is contracted, and aeration of the placenta is prevented.

Most of these babies that are born in a state of apnea are better off if they are left alone. Wrap the baby up, lay it on its side and keep it warm, and usually no further attempts at resuscitation are necessary.

I never give less than a quarter grain of morphin, and I have given as many as three doses at four-hour intervals during the first stage of labor.

Dr. Spiedel (closing).—The obstetrician should no longer hesitate to bring before the public the proper procedures in this important field. Of course, all this is directed to the intelligent men like those before me, who in spite of being busy have time to come to this meeting. We cannot reach the other men and we cannot be held responsible for such men when they try to carry out our suggestions without the proper preparation.

THE HEALING PROCESS IN FRACTURES*

By Robert W. Johnson, Jr., M.D.,
Baltimore, Md.

So much attention has recently been paid to the proper application of mechanical principles in the treatment of fractures that it is without regret or qualms of conscience that this phase is deliberately ignored in this paper. It is the less widely discussed and improperly understood principles of bone physiology and bone chemistry with which we propose to deal. The plumber surgeons have for a long while been better physiologists than the carpenter surgeons, but it is high time for us to catch up and equip our far-sighted mechanical eyes with the bifocals of physiology.

Great advances have been made in the field of the vital chemistry of bone tissue and we are reaping now, in the treatment of chronic bone diseases, the harvest that was sown by the scientific work of Howland, Kramer, Shipley and others, and the clinical observation and enthusiasm of Rollier. We can no longer pre-

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tend to treat rickets or bone tuberculosis without the aid of heliotherapy, and must thus pay due consideration to both physics and chemistry in our battle with these diseases. In the field of fractures can we still afford to ignore the physico-chemical aspects of the healing processes in bone and fasten our whole attention on the mechanical reduction and splinting? Certainly we can do so in 95 to 98 per cent of the cases. That is a very high percentage and for the general practitioner, or even the general surgeon, who treats fractures as best he can because he cannot get anyone else to look after them, such figures are reassuring and doubtless more than sufficient. In this group, however, we are gathered together as bone and joint surgeons and so these figures, good as they are, do not suffice to excuse us from the constant consideration of the chemistry and physics of bone healing. Dr. Finney, in his lectures to us as students, always talked about the hundredth or the five hundredth case which was to be the test of our real surgical ability, and in this he was only extending the scriptural parable of the one lost sheep. As bone and joint surgeons, we must ever be on the lookout for the one fracture which threatens to become a total loss through failure of callus solidification because of faulty lime salt deposition. Do not let it catch us unawares.

Petersen, in 1921, showed that non-union of fractures could be uniformly predicted and obtained by dietary imbalance in dogs. The calcium and phosphorous content of the blood had to be in certain proportions for the callus to become impregnated with lime, and these proportions correspond closely to the figures obtained in the rickets investigations. Here is experimental data of prime importance, and what is more, it is substantiated by the clinical laboratory findings in many cases of non-union which have been observed by us since. Failure of bony union, even when mechanical conditions are satisfactory, can be predicted if the calcium-phosphorous product in the blood falls below thirty-five, and it is probable even when the product is below forty.

What practical meaning has this for us? The average healthy adult leading an outdoor life and eating a good general diet need not be suspected, but children with active rickets, an occasional young adult with peculiar dietary restrictions, depleted adults, or feeble older persons, are to be watched. I can recall instances in each category in which the blood chemistry studies revealed a faulty calcium-phosphorous balance in time to convert an almost certain non-union into simply a slightly delayed union. Blood chemistry tests and proper corrective measures should be instituted as soon as trouble is suspected, while the soft callus remains abundant and active in order that calcification may become possible chemically in this stage before the callus has changed into adult fibrous tissue.

Most important of all is it for us to be sure that we do not attempt to overcome a case of non-union by operation while this causative factor is still present. In a considerable number of cases coming to us for non-union we have found the calcium-phosphorous product below normal and have had to delay operation six weeks to three months until proper diet, cod liver oil and heliotherapy had built up sufficient accessible reserves of these building materials in the system. I can imagine nothing liable to cause the orthopedic surgeon more personal chagrin, if not active censure, than operation upon such a case of non-union in which failure was predestined and also predictable. One cannot make bricks without straw, so it is well to know that the ingredients are there in proper proportion, especially as a not very complicated laboratory analysis of 20-30 c.c. of blood will do it for us.

Next, there are problems of bone physiology which must be understood to secure the best possible results. The service of supply must be adequate to bring the munitions mentioned above to the cells on the battle line of repair, and as an army fights on its belly so, in general, a fractured bone heals in proportion to its vascular equipment. Even more potent as a source of failure than chemical deficiency is interference with blood supply, either arterial or venous. This has been clearly shown in high intracapsular fractures of the neck of the femur where the capital fragment is isolated from blood supply and gradually absorbs after failing to unite. Also this accounts for the frequency of delayed or non-union in certain fractures, such as the mid-forearm or lower third of the tibia, the nutrient vessels being damaged and the collateral supply being inadequate. I would like to illustrate the extent and efficiency of this collateral blood supply by some slides from experimental work recently published. (Six slides and explanations thereof of the diaphyseal portion of the bone.)

With these facts as a background, we can set ourselves the task in fractures of aiding as far as possible the anastomotic circulation and at

least refraining from embarrassing it by too constrictive splinting. In addition, we should not allow our bandaging to interfere with venous return, not only because of the danger of ischemic changes in the soft parts but also because it has very recently been shown by Morton that blockage of the main returning vein constantly produces a failure of normal callus formation. These are the general principles of gross anatomy which are to be applied by us to the proper physiological handling of each individual fracture problem.

At last we reach the trenches themselves and must acquaint ourselves with the training, versatility and morale of the divisions of bone tissue we meet there. I do not wish to reopen the old strife which arose between McEwen and Ollier as to the role of the periosteum, as I occupy a distinctly neutral position. I choose to regard bone cells as specially dressed up connective tissue cells which in times of stress and strain take off their starched collars and high hats and get into the melee as the two-fisted caveman type of more elemental connective tissue. Only in the later stages of repair is there leisure or material for them again to become solid members of society. I have the utmost confidence in the training and versatility of the average bone cell, and if its morale is unimpaired by improper rations, starvation, disease, or infection, a fine reaction of repair is to be expected from the bone cell itself. Certain phases of this repair response of bone cells in various bones and various regions are shown by the following slides taken from experimental work on healing of the short bones which are prone to give us trouble, for example, the carpal, scaphoid and vertebrae.

CONCLUSIONS

The healing process of fractures as a physiological phenomenon is dependent on three factors, each vital to success:

(1) *Material.*—The psychico-chemical reserves and balance in the blood must be adequate to supply lime and phosphorous in quantities sufficient to permit precipitation of calcium phosphate in the matrix and allow ossification.

(2) *Transportation.*—The blood supply, direct and collateral, must be sufficient to maintain viability of bone cells and to furnish channels for the delivery of material to the bone cells at the site of injury.

(3) *Labor.*—The healthy and physiological activity of the bone cells at and near the site of injury must be understood and properly safeguarded, especially in open reductions where the operator is liable to lose sight of physiology in his attempts to obtain mechanical perfection. To attain 100 per cent success in fractures we must not merely set the bones and splint them, but we must be sure that the above physiological prerequisites are both thoroughly understood and painstakingly attended to early and late in the course of healing.

More important still is the application of this physiological point of view to all bone diseases, since in these the repair activity of the cells is more severely tested than is true in the usual fracture case. We must approach bone repair in tuberculosis in just the same physiological manner in order to secure best results.

In teaching, too, an understanding of the physiology of repair of bone tissue is the first essential in grounding the student in the principles of pathological physiology which must precede rational treatment of bone and joint lesions.

DISCUSSION (*Abstract*)

Dr. Isidore Cohn, New Orleans, La.—In studying the repair of bone there are several things which seem clearly proven to our mind. One is that when the surface of bone is freed of periosteum and is irritated, we have a proliferation of new bone. This easily activated layer of cells corresponds to what is called by some the cambium layer of periosteum, cortical osteoblast by others, and eposteum by Hey Groves.

It is noteworthy that our own experiments determined that the defect was repaired from the end-osteum primarily, and not from the ends of the bone, nor from the connective tissue membrane covering the bone.

I would like to ask Dr. Johnson whether he has carried on experiments in his fracture cases to determine the calcium content of the blood during the stage of repair?

Dr. H. Earle Conwell, Fairfield, Ala.—In our orthopedic service at the Tennessee Coal, Iron and Railroad Company's Hospital at Fairfield, Alabama, it is interesting to note the small percentage of non-union cases among our fractures. In the past two years we have had only three non-union cases out of a series of one thousand fractures. This does not, however, include the delayed unions, of which type we have had several. In every non-union case the tissues were severely traumatized and in two of the cases the non-union occurred around the lower one-third of the tibia.

The delayed union cases all suffered severe traumatism and also occurred in locations where there was a limited blood supply. Every case was aided by the administration of physiotherapy, cod liver oil and calcium salts and other methods which would increase the physical resistance.

The majority of our cases occurred in the negro, and I am inclined to believe that in spite of the traumatism and location of the fracture the chemical make-up of

these individuals had as much to do with delayed union as any of the other causes. Chemical analysis of the blood should be done in every case of delayed or non-union.

Dr. Johnson (closing)—Chemical content of the blood during healing has not occupied our attention. We have checked up on cases where the risk of non-union appeared probable, to get them to a point of high calcium-phosphorus product. When we once get them to that point they seem to maintain it long enough to heal a simple fracture. We did not carry out repeated tests during the process of healing. In our non-unions the percentage of calcium-phosphorus deficiency is quite high, probably about thirty per cent.

I do not figure very heavily on osteoclasts and osteoblasts. I consider any cell in the neighborhood of the bony structure, lying close to the bone, in close apposition with the bone tissue, as a bone cell and such a bone cell is potentially a new bone former.

The outer layer of the periosteum is a limiting membrane, but also useful in the healing of fractures as a very vascular source of blood supply to the region of the fracture.

Any cells, except the fat cells and hemato-poietic tissue in marrow, will undertake bone tissue formation if stimulated. For that reason, I choose to call them bone cells, rather than osteoclast and osteoblast cells.

The calcium-phosphorus product should be around forty

RABIES AN UNNECESSARY DISEASE*

By C. A. Shore, M.D.,†
Raleigh, N. C.

Considered only on the basis of the annual death rate, rabies could be dismissed as a minor health problem. Nevertheless, there are good reasons why the subject is of legitimate concern to every public health organization.

As a matter of fact, the death rate is kept low only by means of the well-organized and expensive work of many laboratories, and by the troublesome and prolonged prophylactic treatment applied to many thousands of persons. In spite of this work there were 92 deaths from rabies reported in the United States in 1926 (Rice). These 92 deaths cannot be dismissed as negligible, if we can show that each could have been prevented.

Additional argument could be found if we should attempt to estimate the economic loss in livestock. Observation through many years convinces me that this loss is far greater than is generally supposed, but no accurate statistics have ever been attempted, and our chief concern as physicians and health officers is with the infection in man.

At the present time rabies has an almost world-wide distribution with the notable exception of certain countries in which it is non-existent. It is particularly prevalent in Russia and in India. In our own country it exists in all of the states, but is most abundant in the South. The history of rabies goes far into the past and there are in existence excellent clinical descriptions written two thousand years ago. It has always been considered with peculiar horror on account of its many differences from all other diseases, and because of its inevitably fatal termination.

From the earliest times it has been known that the infection is spread by the bite of rabid dogs, while the clinical symptoms are those of disease of the central nervous system. This may account for much of the myth and superstition which accumulated during the centuries. In spite of unusually complete scientific knowledge, some of this superstition still remains.

It is not necessary to review the work of Pasteur, but his discovery and trial of the prophylactic vaccine stands as one of the great epochs of medicine. Pasteur was unable to demonstrate the causative agent, but was convinced that a living organism was responsible. In 1903, Negri of Pavia found certain round or oval bodies in the nerve cells, particularly in the cells of the hippocampus and cerebellum, and he believed that these bodies were protozoa and that they were the infecting agent. Ever since his day the presence of these bodies in any brain is accepted as a positive diagnosis of rabies, and such diagnosis can be confirmed by animal inoculation in practically every case. However, the true nature of the Negri body is still a subject of controversy. It is admitted that the virus will pass through porcelain filters and the Negri body, as such, manifestly could not. Levaditi and others claim that the Negri body is merely one form of a protozoon belonging to the sub-class sporozoa and that certain forms of the organism may be so minute that they pass through the porcelain filter, and that the Negri body is the pan-sporoblastic form of this organism.

It is interesting to note that similar claims have recently been made for certain yeasts and also for the tubercle bacillus: that both are filterable viruses.

As already stated, the clinical symptoms of

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†Director, State Laboratory of Hygiene, State Board of Health.

rabies are almost wholly an expression of damage to nerve cells. In animals belonging to the group of canines, a common symptom of the disease is the desire to bite. Other animals show this symptom only infrequently. Since the disease is contracted only by inoculation, and in nature by the inoculation of infectious saliva by means of a bite, it is the dog and his relatives which are responsible for the existence of rabies. This is not because the dog is more susceptible than many other mammals, but only because of his desire to bite when mentally ill. Unfortunately it is the dog above all other animals that has closest intimacy with humans and that also has the greatest freedom in modern civilization.

It is for these reasons that the problem of the control of rabies is a problem concerned with the dog alone. In countries where wolves and jackals are abundant the extermination of rabies may depend upon the extermination of these wild animals, but in Western Europe and in the United States, with the possible exception of certain Rocky Mountain areas, the problem depends only upon the control of the dog. The extermination of the dog is not necessary. By the one simple procedure of restricting the liberty of the unmuzzled dog we could eradicate rabies from the face of the earth.

This statement is neither extravagant nor theoretical. The deed has actually been accomplished in Great Britain, in Denmark, and in Norway and Sweden. It has never existed in Australia because that country has always had a strictly enforced quarantine applied to dogs.

Thirty years ago rabies was prevalent in England, but the national health board was given full authority to attempt extermination. Sufficient notice was given, and after a certain interval all dogs found at large without a muzzle were destroyed. In less than two years no case of rabies could be found in dogs or other animals and the regulations were relaxed. The disease was re-introduced in 1918 by returning soldiers who smuggled in dogs from France, but similar measures, which had to be enforced in only two or three counties, were again completely successful and England has again been free from rabies for six or seven years.

We are told that it would be impossible to eradicate rabies in this country because our people are too fond of dogs. It is the dog owner and the dog fancier who should be the first advocates of any merciful measures which would protect their dogs, even if they have no interest in the public health. I am unwilling to believe that we as a people are so much more ignorant and prejudiced than the people of England and Scandinavia that we would not submit to reasonable restrictions if the medical profession and the health authorities would seriously make the attempt to secure needed legislation and to inform the public of the reason therefor.

Unfortunately some of our health organizations and legislative bodies have been confused by the claims of the Japanese plan of prevention by prophylactic vaccination of dogs. The chief argument of the advocates of this plan is that it is difficult to enforce complete restriction of dogs and that instead every dog should be given an injection of vaccine. Admitting that the enforcement of any law is difficult, it is, on the other hand, absolutely impossible to reach every dog with a prophylactic injection and to revaccinate him each year. Besides, the vaccine does not give complete protection, and it has been known in rare cases actually to produce the disease. These cases are fairly numerous when attenuated vaccines are used, but there have also been a few after the use of the so-called killed vaccines. The only conclusion possible is that the vaccine was not completely killed.

To illustrate the inefficiency of animal inoculation we have but to consider the results in Japan, where the plan originated. It has been some ten years since the Japanese first championed the vaccination of dogs, yet we find that at the present time the disease is still prevalent in Japan.

In April of this year the Health Section of the League of Nations held an International Conference on Rabies in Paris, and among other questions the vaccination of dogs was given consideration. It was advised that the experimental study of the vaccination of animals be continued, but the Conference, which was composed of delegates from twenty-nine countries, unanimously adopted the following resolutions:

"In the opinion of the Conference the only measures which will completely eradicate rabies are: the restriction of the liberty of the dog, unless muzzled, to the premises of the owner and the destruction of the ownerless dog, and the Conference recommends that these measures be embodied in the legislation of the various countries."

In this country concerted state action would be necessary for complete eradication, but there is no good reason why any individual state should not proceed as far as possible. So far as I know, none of our states has ever at-

tempted rational control, so it is idle to say that a good law could not be enforced. With proper information about the object of the law we should be able to secure the assistance of all breeders of dogs, and of the great majority of intelligent owners, of all stock raisers and of all departments of agriculture, and surely all public health officers should welcome the opportunity, unique among their other problems, of exterminating a very deadly disease.

DISCUSSION (*Abstract*)

Dr. Oscar Dowling, New Orleans, La.—Those who know something about the history of rabies are well aware that the disease, while most prevalent in France, Belgium and Russia, had, before the World War, been completely eradicated from England. The British not only did not concede the necessity of tolerating, but they made strong and successful efforts to suppress it. The British love their dogs.

The stringent measures adopted by them were the outcome of experience. At one time the disease was very prevalent. In 1889 a muzzling law was promulgated which reduced the number of cases from 80 in that year down to 6 in 1892. Then the emotional complex getting the upper hand in this year, resulted in a relaxation of the stringent measure. During the following three years the number of cases rose rapidly until in 1895 there were 672 instances of rabies in dogs and 20 human deaths. The muzzling law and quarantine regulations were again rigidly enforced. The results were immediately apparent. In the next year (1896) the number of dogs infected was 438 with 8 human deaths. In 1897 there were 150 dogs infected with no human cases. The number of canine infections decreased rapidly to 1 in 1901; there were 13, however, in 1902, and from that time on until the World War rabies was unknown. The muzzle and the six months quarantine of all dogs entering the Isles were sufficient. During the latter part of the Great War a dog was smuggled in by aeroplane. This dog developed rabies and became the source from which a considerable number of canine infections developed. It was necessary to re-install the Pasteur Institute that had not been functioning for years as a prophylactic station. Later, when it was considered that the danger had passed, this was also discontinued.

Common sense, good judgment and the application and enforcement of strict laws and rules were enough to stamp out hydrophobia and keep it out of England. The same organized opposition has been effective in keeping it out of Australia, Denmark, Norway and Sweden. It is said in the last three countries that no case has occurred within the past fifty years.

Hydrophobia is prevalent in practically every other country of the world. It is true that it is a comparatively rare disease, but it is accompanied by most exquisite suffering and is invariably fatal. Though the incidence among the lower animals is steadily on the increase, the number of human deaths has been relatively small, and there are now decidedly fewer than in the year 1890. The Census reports state that in that year there were 133 deaths reported from thirty states. In 1908 there were 111 deaths; in 1911, 98 deaths, and for the decade 1910 to 1920 an average of 63 deaths every year within the Registration Area.

In 1920, which is as far back as we have reliable statistics on the number of treatments carried out at the Pasteur institutes, we find that 3550 persons were subjected to the prophylactic injections in thirty-four states. In 1921 this had increased to 4667. In 1922, 6041 people were given rabies treatment, and this figure rose to 6118 in 1923. It is perfectly evident that while the number of deaths has not been doubled, the potential possibilities for a fatal termination have been. It is the knowledge that the Pasteur treatment is the only salvation that has prevented the number of fatal terminations from exceeding 37, which Eichhorn claims occurred in 1923. He also is responsible for the statement that 50,000 people were compelled to take treatment in Russia as a result of the revolutionary upheaval. Recent reports from India also indicate that the value of the Pasteur prophylaxis is becoming widely known and proving very effective in that country.

In Louisiana, 165 animal brains were examined in 1925 and 100 were found to show infection. In 1926, 134 examinations were made with 79 positive. Up to the present time in 1927 there have been 87 examinations made with 50 positive results.

This does not look like an increase in the prevalence of rabies within my State. Nevertheless, I am firmly convinced that Louisiana is no exception to the general rule which observers have noted throughout the United States. The consensus of opinion, whether or not supported by figures, seems to be fairly indicative of the prevalence, and this doubtless leans toward the belief that rabies is certainly not declining. There were three deaths in Louisiana in 1925 and 1 in 1926. So far there has been none during the present year.

Rabies can be stamped out if people would only be unified in their efforts and strive to attain this definite end. I have already mentioned the effectiveness of quarantine and muzzling regulations; these two measures have only been effective when enforced to the extreme letter of the law. There is one more method that is more applicable because it is easier to get every one to conform to it, and that is the suppression of rabies by eliminating the carrier, or at least preventing the creation of new carriers.

Japanese workers of the Kitasato Institute are said to have originally vaccinated or subjected to injections of a virulent rabies virus 31,307 dogs. Of this number only 2 developed the disease. Hata reported a series of 104,629 inoculations in May, 1924, in Tokio and Yokohama. Only 41 of these, doubtless late infected animals, developed rabies. The same method of prophylaxis has been carried out in the Eastern cities, notably Philadelphia, and has been very successful in reducing the canine incidence.

Since the publication of Hata's results the inoculation of pet animals with rabies vaccine has become more and more popular. The injection is extremely simple and the big manufacturing companies are preparing it in such large amounts that the price is relatively insignificant. In Louisiana we have a model ordinance which embodies this feature of prophylaxis and makes it obligatory that all dog owners vaccinate their dogs, in default of which the dog will be destroyed or the owner fined, provided the former is allowed to run at large.

Rabies is no more necessary than smallpox; both can be suppressed completely. The only reason rabies exists now is that public opinion is not sufficiently aroused.

Dr. D. J. Williams, Gulfport, Miss.—Sufficient laws

and efficient officers are necessary for eradication of rabies. The state boards of health should no longer dodge the issue and wait for the state legislatures to act. They should pass such restricting laws as will control this disease at an early date. The various police officers will not do their duty; therefore, it should be permissible or legal for any citizen to kill any so called stray dog, or dog running at large unmuzzled.

In addition, when the pound pens are opened up there should be a provision for vaccinating dogs empounded or redeemed. It is a simple problem, as has been illustrated by those nations that have rid themselves of the disease. The experience of the Japanese teaches us a lesson.

When the boards of health take this view not only with reference to rabies, but with reference to other diseases as well, public health problems will be more readily solved.

Dr. S. S. Cook, Lieut. Com., Medical Corps, U. S. Navy, Quantico, Va.—In Washington a man who has done a great deal of work on the question told me the only practical, sure method of vaccination was the Hedges method of six inoculations. That rules out vaccination, because it is a physical impossibility to get hold of dogs six times. He offered us a tentative plan of giving two instead of six inoculations, and he was convinced that the single inoculation was practically of no value. However, in the Army the single inoculation is enforced, with very satisfactory results.

What type of muzzle is satisfactory? We tried several kinds and had trouble with small dogs. The muzzles will not stay on the dogs' heads, especially the small dogs.

Dr. W. C. Hatchett, Huntsville, Ala.—I went before the City Council early last fall and suggested that something be done about stray dogs running on the street. The Council passed an ordinance regulating the condition. A Ford truck was arranged with cages and put in charge of the Police Department. Several trips daily were made over the streets gathering up stray dogs, and up to the present time between five and six hundred have been disposed of. Last year sixty-nine treatments for the prevention of human rabies were given in the City of Huntsville and police jurisdiction. Up to the present time not a single treatment has been given this year. We owe the results to our city officials.

Dr. H. S. Mustard, Murfreesboro, Tenn.—I should like to ask Dr. Shore's opinion as to the transmission of rabies through the milk of a cow bitten by a rabid animal.

Dr. R. K. Flannagan, Richmond, Va.—In Halifax County, Virginia, following a serious outbreak of rabies among dogs, the health officer, with the help of the veterinarians, vaccinated practically all of the dogs in the County, some 3000 of them. The outbreak was apparently controlled and the disease has not recurred there to any great extent. However, the State Board of Health of Virginia is not persuaded that canine rabies vaccine is a specific against rabies, and is therefore not now recommending it in any wide way.

Dr. A. T. McCormack, Louisville, Ky.—I should like to urge that as far as we have the power, we get rid of the German police dogs. They are naturally vicious. Rabies has been much more prevalent in Kentucky since they were imported than before they came. We have tried vaccine. It has apparently had little effect. We have had better luck in ordering the sheriff to shoot stray dogs. Where we can do that, it has been very effective.

The suggestion of Dr. Shore and the drastic statement of our Chairman are very much to the point. It is a question of whether we have the intelligence in this Country to take the comparatively simple course which we need.

Dr. S. W. Welch, Montgomery, Ala.—In Alabama it is costing us between $3,000.00 and $4,000.00 per month to furnish rabies treatment to people who have been bitten by worthless dogs. At the same time, I could not accept the suggestion of our Chairman to give every citizen the right to shoot every dog he saw on the road. Our courts are rather cluttered up now with homicide cases, but if we adopted this method of control, there would not be any juries left in the country to find indictments for men who had been shot for killing dogs.

We tried the muzzling act. I never have seen any make of muzzle that will stay on a dog. That proposition is a failure.

I was in hopes that we could find a vaccine that would work in a reasonable number of doses.

We were greatly disappointed in Washington last year to find that the Bureau of Animal Husbandry had thrown up its hands and said it could not find a vaccine that would immunize dogs. It is to be hoped that such a vaccine will yet be found. Without it the case is well nigh hopeless.

Dr. J. A. Hayne, Columbia, S. C.—I, like Dr. Welch, was disappointed at the Surgeon-General's Conference in Washington last year. I was under the impression that the Japanese experiment was considered conclusive. It was so conclusive that the United States Public Health Service sent out a pamphlet on the subject, not as a pamphlet of the Bureau, but it was accepted as more or less official. On that basis we have vaccinated many dogs in South Carolina, and especially in Charleston. Charleston reports less rabies than ever before. We lead all other states in the amount of hydrophobia in the United States. Last year the laboratory treated 950 individuals. We are fortunate in not having to send the money out of the State, as the vaccine is made in our laboratory, but it takes a great deal of time to prepare 21 fresh doses. Multiply 21 by 950 and you have an idea of the work. The disease showed a slight decrease this year, but not much. Up to the first of October we had treated over 700 individuals bitten by rabid animals.

The suggestion that they be muzzled has been considered; the suggestion that they be shot has been considered; but, like Alabama, we have enough homicides going through our courts now and we do not send people out to shoot other people's dogs. I have nothing in my mind at present in the nature of a solution of the question. We know that England, by putting a quarantine on animals being brought into England, was completely rid of rabies. We know that when the American troops went over they carried their mascots. Almost every company carried a dog as mascot, and when they left there was a great deal of rabies in England. England again applied its measures, and again was rid of rabies.

When I was in Panama there was no hydrophobia, or rabies. The Americans carried their dogs with them during that war, and introduced hydrophobia there. There was an epidemic: six or eight marines were bit-

ten and were carried back to Washington for treatment. It is a grave consideration.

Park stated to me that the reason vaccination was not effectual is that there are many strains of rabies. A vaccine which will protect against one strain will not protect against another. We need a vaccine which will overcome this difficulty.

Dr. T. C. Terrell, Fort Worth, Tex.—We have been in rabies work since 1916. When the immunization of dogs by the single dose method came in vogue, we prepared the vaccine by the technic that was given us by the United States Public Health Service, using the brain and cords of rabbits. We did not use the Japanese method of making the virus, that is, using the brain of a dog, and it was our belief that fixed virus from rabbits gave a higher immunization than that from dogs. It has been proven that the animal is not always immunized by the single dose or by the two dose method. This was proven by injecting 0.5 c. c. of 1/20,000 solution of a fresh rabbit brain, the average minimum lethal dose, into the brain of the animal that was supposed to be immunized.

It has been our experience in animal experimentation that the killed virus vaccine will give a higher immunity than the old original Pasteur treatment, and there is no danger from the treatment itself.

In 1919 we discontinued the use of the original Pasteur treatment and, since that time, we have treated 4300 patients by the killed virus method and have had only two failures. The killed virus method gives greater immunity and is easier to handle and less dangerous, and it is possible to send out the full 21 doses at one time, provided the vaccine is kept on ice. If it is kept on ice it will retain its potency for at least a period of six months, and, if not kept on ice, we have proven that the potency is still present at the end of the sixty-day period. Even at the end of this time it will give as high immunity as the old Pasteur treatment.

Many people think that a dog that has received the one dose treatment cannot take rabies, and this gives a false sense of safety. We have examined a number of dogs that have developed rabies after having had the single dose, and, for that reason, we have discontinued the manufacture of the single dose material in our laboratories. We do not believe that it will produce immunity in a sufficient number of cases to justify its universal use. One of our cases of human rabies developed from the bites of a German police dog that had been immunized by one of the prominent manufacturers' products, the dog developing rabies about four months after immunization. He attacked a girl, who was about twelve years old, severely lacerating her about the face and on the legs. The youngster was so badly lacerated that something like a hundred stitches had to be taken in her face. On the twenty-second day after being bitten, and on the eighteenth day of treatment, she developed rabies and died. Now, the owner of this dog said that she had been told that it was impossible for a dog that had been immunized to develop the disease. For that reason she would not believe that the dog was rabid or consent to have it killed until four days after it had bitten the youngster.

In choosing the kind of prophylactic treatment the method that is the safest and most easily carried out should be the one adopted. We recommend 21 doses consisting of 3 c. c. each of the 1 per cent killed suspension.

Dr. Shore (closing).—It has been shown that the milk of a rabid animal is infectious when injected under the skin of other animals, but I believe that all attempts to produce rabies by the feeding of such milk have been unsuccessful.

Concerning the different methods of preparation of the vaccine, it is probably true that the carbolized and etherized vaccines retain their potency for a long period and they are now generally used in tropical countries, but it is doubtful that these vaccines have greater immunizing properties than the glycerinized vaccines.

The particular point which I wish to emphasize in my paper is that the vaccination of animals is disappointing. We have but to compare the ten year effort in Japan to exterminate rabies by vaccination with the British plan of confinement and muzzling. The first is still unsuccessful, while Great Britain succeeded in exterminating rabies completely within twenty-two months.

In trying for effective laws in this Country the muzzling should be a secondary point. We should emphasize the restriction of the dog to the premises of the owner. If he objects to that, then he may have the option of providing a muzzle for his dog. I have no particular make of muzzle to recommend, but I do know that a muzzle may be both effective and merciful. It should permit the dog to open his mouth freely for breathing and drinking, but there should be a small cage over his mouth to prevent fighting and biting. Such a muzzle is no more unmerciful than is the bridle and bit to a horse.

Finally, all breeds of dogs are equally susceptible to rabies. The biting mania of the rabid dog is not a universal symptom, but so far as I know the lap dog is just as apt to have this symptom as is the street dog. The strength of the large dogs make them more dangerous, but that is the only difference.

TRANSPORTATION OF FRACTURES IN RAILWAY SERVICE*

By ARCHIBALD EASTWOOD CHACE, M.D., F.A.C.S.,
Texarkana, Ark.

It is a problem to bring the fracture case and the best available means of treatment together. The average practitioner of medicine is not equipped to handle fracture cases, although one occasionally sees very excellent work in this line done by a general practitioner without even minimum equipment. When the distance to more efficient treatment is very great, one sometimes is put to considerable uncertainty as to the best method of care. Whether or not all fracture cases should be transported to a central hospital is largely the question which we shall here discuss.

*Read before Southern States Association of Railway Surgeons, Auxiliary of the Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

The transportation of fractures resolves itself into primary and secondary transportation, that is: following emergency treatment and after complete reduction and permanent fixation. In either case it connotes the preparation of the patient as well as the means of conveyance. Also, in railway practice, certain legal considerations influence transportation.

To determine the kind of fractures likely to need transportation, *Table 1* is presented, showing 500 consecutive cases of fracture transported an average distance of 150 miles to a railway hospital in the Southwest. A glance at this table will show that all these cases were not transported for surgical reasons alone, although the lack of facilities in small towns in this region is noteworthy. *Table 2* shows the compound fractures among the 500 cases in *Table 1.* Many of the 500 had severe injuries to the soft parts as well as the fractures.

An analysis of *Table 1* shows the following per cent of fractures transported: skull, 2 per cent, vertebrae, 1.4; patella, 0.2; radius and ulna, 11.8; bones of the hand, 22.4; femur, 2.4; facial bones, 2.8; humerus, 2.2; bones of the leg, 13.8; tarsal bones, 3.4; other bones of the foot, 28; ribs, 2.8; clavicle and scapula, 4; pelvis, 0.8; and mixed fractures, 2 per cent. Of these, 76, or 15.2 per cent, were compound. The problem of transporting the major portion of railway fractures ought to be a simple problem, since over 86 per cent are fractures of the bones of the face, forearm, hand, foot, leg, ribs and shoulder girdle. The more difficult cases to transport, such as fractures of the pelvis, femur, humerus, vertebrae and skull, comprise only 8.8 per cent of the total. To these should be added the mixed fractures, so that one may say roughly that 11 per cent of the fracture cases needing transportation in railway practice are of the more serious types from the transportation viewpoint, that is, one in nine.

TABLE I

FIVE HUNDRED CONSECUTIVE CASES OF FRACTURE TRANSPORTED TO A RAILWAY HOSPITAL FOR DISTANCES VARYING FROM TWO TO FIVE HUNDRED MILES. AVERAGE DISTANCE TRANSPORTED, ABOUT ONE HUNDRED AND FIFTY MILES.

Skull	10	Other tarsals	3
Lower jaw	9	Metatarsals	64
Nasal	3	Phalanges, toes	76
Sup. maxilla	1	Ribs	14
Malar	1	Clavicle	1
Vertebrae	7	Scapula	3
Humerus	11	Pelvis	4
Radius	9	Humerus and patella	1
Colles'	29	All bones of legs and arm	1
Ulna	14	Pott's and Colles'	1
Radius and ulna	7	Skull and clavicle, with dislocation of hip and shoulder	1
Metacarpal	27	Skull and mandible	1
Carpal	1	Both bones, both legs and metacarpals	1
Phalanges, fingers	84	Skull and femur	1
Femur	12	Tibia, fibula, Colles	1
Patella	1	Clavicle, scapula, rib	1
Tibia	13	Skull, ulna, radius	1
Pott's	18		
Fibula	20		
Tibia and fibula	18		
Os calsis	14		

Of these fractures, 76 were compound, many were comminuted, and many involved more than one bone of the class, that is, phalanges, metacarpals, etc.

TABLE II

COMPOUND FRACTURES FROM TABLE I

Pott's	1	Skull	4
Femur	1	Mandible	3
Tibia	3	Metacarpal	4
Humerus and patella	1	Os calcis	2
Metatarsal	3	Nasal	1
Tibia and fibula	4	Radius	1
Humerus	1	Phalanges of fingers and toes	46
Ulna	1		

The preparation of the patient before he enters a conveyance does not vary in railway work from the preparation of patients in other kinds of fracture practice. Only a few general rules will, therefore, be suggested, and no attempt will be made to discuss emergency treatment except as it may affect transportation.

(1) Except in very unusual conditions, all fractures of the larger bones should be adequately immobilized before the patient is moved from the spot where the injury has been received.

(2) All fractures should be transported to a hospital where efficient care can be given, within three hours if possible. The treatment of fractures where a skilled surgeon, adequate x-ray and modern appliances are not to be found has no place in railway surgery.

(3) If the three-hour limit must be exceeded, two methods are open to the surgeon: (1) in fractures of the femur where failures without proper facilities are notorious, in comminuted fractures of the tibia, in crushing fractures of the knee joint, and in many other fractures, excepting Colles', Potts' and some easily reduced fractures from the functional standpoint (as of the clavicle), the surgeon should temporize with good fixation and transportation as soon as possible without attempts at reduction. (2) When reduction is comparatively easy and certain, and when hematoma, edema and blebs are likely seriously to interfere with reduction later, as in Potts' and Colles' and similar fractures, then the most suitable place where an anesthetic can be given should be selected, the fragments reduced, the part again splinted, and the patient sent usually on the following day to a hospital for x-ray and further treatment if it is required and advisable.

(4) If the fracture is compound, an aseptic or antiseptic dressing should be applied after removal of the clothing by scissors only, the part splinted so that no retraction of the protruding bone is likely, and the patient sent to a hospital for operation, irrespective of the time required, unless it is over twenty-four hours. The protruding fragments should never be reduced on the right-of-way, in a drug store, patient's home, or elsewhere, unless modern operating room conditions are obtained, and this is rarely possible. When a protruding bone has been pulled back into the tissues before the arrival of the surgeon by well meaning but thoroughly misguided first aid workers, the utmost speed in getting the patient to a hospital for operation should be obtained; not failing to broadcast the misdeed of said first aid interference, and not making the mistake of some surgeons who go the first aid worker one better by sewing up the skin wound.

(5) The method of splinting, of course, varies with the bone and kind of fracture, and this subject will undoubtedly be discussed by others in this symposium on fractures. Weight traction is not usually practical for transportation, so that fixed traction as exemplified in the Thomas splint, or coaptation splints, must be substituted. The latter must, of course, be long enough to immobilize joints on each end of the broken bone, be well paded, and circular constriction must not be too tight.

(6) A stretcher with iron hinged cross members and iron loop supports is ideal, since it closely resembles a Bradford frame. A cot sways too much, especially in a baggage car, so it will, unless it is very rigid, cause discomfort; and will not go through the average car window. A mattress from an upper berth may be placed on the stretcher under the patient, especially in cold weather. In lieu of a stretcher, a heavy mattress from a single bed laid on the floor of the baggage car is fairly comfortable. Stretchers are, or should be, provided in station baggage rooms, cabooses, baggage cars, round houses and shops. The type of stretcher described above, plainly marked with the name of the railway company, is much less likely to be stolen than a cot, and so is usually to be found when wanted, especially if someone is accountable for the distribution, repair, and return when used. A receipt signed by the official, or chief clerk, in charge of the office at each shop and roundhouse, the baggage master in each baggage room, the conductors for the cabooses when not pooled, and the superintendent of baggage service, or general baggage master, for the cars under his control, is a salutary procedure. Means to keep the patient warm and whatever is needed for emergency should be provided.

For secondary transportation, nothing further need be said, since the patient is already prepared.

Transportation.—After preparation, the method of conveyance varies with the situation.

The method of conveyance may best be considered under the most unfavorable conditions. Given a major fracture, five miles from a station, the patient a section hand, lying near the right-of-way fence, prepared for transportation, except that no stretcher is available; what is to be done? The patient may be moved by an improvised two coat or blanket, double pole stretcher to push car, or motor car, of the section crew, a distance of about one hundred feet, or less. The time elapsed from the injury to the arrival of the surgeon and preparation of the patient is sufficient, if the section crew think ahead, to gather the materials for such an improvised stretcher, the push car attached behind the section motor car, and some support for the ends of the stretcher poles. Thus conveyed, the patient can be moved to the nearest station, transferred to the stretcher, thence to the baggage car of the next passenger, or to the caboose of the first freight train. Time and pain may sometimes be saved by flagging a train at the place of injury. The time consumed will vary with the accessibility of the surgeon, and the opportunity to get train or motor car conveyance. If hospital, or equally good, care can be had within fifty miles, and the patient is ready to move in one hour, it would appear possible to obtain competent attention in about three hours.

The various means of conveyance may be listed in this way:

(1) Stretcher.

(2) Push car.

(3) Section motor car. You notice that the section hand car is omitted for the reason that unless supports are nailed, screwed or bolted to the car for the poles, it is almost impossible to place a stretcher safely on the average hand car. On some motor cars a bent pipe is fastened above the seat to act as a hand hold. This makes it difficult to get a stretcher under the safety device.

(4) Caboose.

(5) Baggage car.

(6) Sleeping car; stretcher through window.

(7) Isle of coach, or in warm weather an empty box car.

(8) Ambulance.
(9) Automobile
(10) Wagon.
(11) Hospital car, unit car, or the like.

The tonneau of an automobile, or the bed of a wagon, filled with mattresses and pillows, is a frequent and not altogether uncomfortable conveyance. A push car is a rough rider, and so is a section motor car, especially if a speed exceeding five miles an hour is maintained. Small stones and dirt on the track at a highway crossing feel to the patient like so many sticks of dynamite going off, and some method of suspension is almost necessary for the comfort of the patient. Hospital and unit cars are mentioned. Dr. Crowder, of the Pullman Company, has loaned me some photographs of such cars built by that company, mostly with the advice of the United States Army Medical Corps for use along the Mexican border and during the World War. The Glennon adjustable bunk is especially interesting in discussing the transportation of fractures. However, in railway practice I am inclined to agree with a certain army officer who had much to do with hospital cars and trains when he said that the tourist sleeper, with slight alterations, did about as well, yet the hospital car was a huge success with the layman, psychologically.

In primary transportation of fractures, next to adequate immobilization, quick and comfortable transportation is imperative for the badly injured man. There is no time to wait for fancy facilities, nor are they necessary.

There are several legal questions involved in the transportation of fracture cases. Is a common carrier liable in damages for refusal to accept such a case? What duty does the carrier owe to an employe so injured while at work? To a passenger? To a trespasser? What duty to provide unusual facilities, such as a special train, when no other means of transportation is available within a reasonable time? Is there liability in case of delay, train accident, or other negligence on the part of employes, when they are proximate causes of unnecessary suffering or other injury to the patient?

In answering these questions, one must confine oneself to the cases which have been decided by the highest courts, and not attempt to forecast the probable result at any particular trial, and in this short paper only general statements with a superficial analysis can be given.

Is a common carrier liable in damages for refusal to accept for transportation a fracture case? It has been held that:

"while persons who are ill or afflicted have a right to enter and travel on the conveyances of a common carrier of passengers, nevertheless the carrier is not bound to accept as a passenger without an attendant, one who, because of physical or mental disability, is unable to take care of himself, or is liable to require extra attention from the carrier or the passengers."

Payment for transportation of both patient and attendant may first be required, unless it is customary to furnish free transportation for injured employes. One railroad has been held liable because a foreman refused, or neglected, to telegraph for a pass for an injured employe when it was his duty to do so. A fracture case with an attendant, if required, cannot, therefore, lawfully be excluded from transportation on the ground of disability.

The most important question, and the most frequent, concerns the carrier's duty to an injured employe. The following quotation from *Corpus Juris, vol. 39, page 240,* outlines this duty for employers in general:

"In the absence of a statutory or contractual obligation, there is, as a general rule, no duty resting upon the employer to provide surgical or medical attendance or medicine for an employe who is injured or becomes ill while in his employment, except perhaps in a case in which the employe gives his services without compensation. However, there is a tendency upon the part of the courts to hold that, where in the course of his employment a servant is suddenly stricken down in a manner indicating immediate and emergent need of aid to save him from death or serious harm, the master, if present, is bound to take such reasonable measure or make such reasonable effort as may be practical to relieve him, even though the master is not chargeable with fault in bringing about the emergency, and in some jurisdictions it is said to be the duty of the employer to provide medical and surgical assistance in the case of an emergency where it is imperatively demanded to save life or to prevent further serious bodily injury. Hence it has been held that a railroad company, in the absence of any contract, obligation, or a statute regulating the subject, is under a legal duty to use reasonable care in furnishing medical aid and suitable attention to its employes who are injured in the course of their employment, although the injury may not have been caused by the negligence of the company, and there is authority in behalf of extending this rule to all employers engaged in hazardous employments. Where, after the injury, the master exercises ordinary care to secure and provide first aid for him and to secure surgical and medical treatment at the hands of competent physicians and surgeons, it fully discharges its duty. In any event, in order to hold the master liable for damages resulting from failure to exercise diligence and provide medical or surgical assistance, such failure must be the proximate cause of the injury. The master is not liable to an injured servant by reason of the fact that he is taken to a public hospital against his will, where the master is not shown to have authorized such act. Nor is the master liable for the treatment of the injured employe at the hospital

where it is not shown that such treatment was by an agent of the master."

It would appear that in most jurisdictions a railroad is liable if it is negligent in furnishing first aid to an employe who has sustained a fracture, in transporting him to a proper place for permanent care, and in the selection, if it presumes to make a selection, of the surgical attendant. This statement is based upon the supposition that the case requires one or all of the acts named for his proper care.

The duty of a carrier to a passenger is even higher than its duty to an employe, unless the passenger is injured by his own wilful act. Whether the carrier is negligent or not in relation to the injury to the passenger, a duty to provide first aid, transportation to a place for permanent care, and if so requested to select a reputable and competent surgeon, arises. The contract entered into when a passenger buys a ticket and enters upon the property of the carrier provides for safe conveyance, and when the passenger sustains a fracture during conveyance, whether or not by the negligence of the carrier, the duty to render first aid, conveyance for treatment, and even hospitalization at the demand of the passenger, arises.

To a trespasser, unless perhaps the fracture is caused by hidden danger, no duty to render assistance or transportation arises when injured upon the right-of-way, or upon a conveyance, of the carrier. Frequently the situation of the trespasser is, however, so desperate that there is a moral obligation at least to render some assistance. The attractive nuisance rule in the case of children is an exception in some jurisdictions.

When no means of transportation is available within a reasonable time, the carrier is legally bound to run a special train if the equipment is at hand. For example, an employe of a lumber company sustained a fracture at the logging camp, some miles from the town where proper surgical assistance could be obtained. Because the company failed to run a special train within twenty-four hours after the accident, and it was shown that the patient suffered damage because of the delay, the lumber company was required to pay in damages. In short, the duty to transport having arisen, the carrier must undertake the duty with that care which a prudent man would exercise under the conditions. Therefore, the carrier is liable for any negligence in the transportation of the patient, whether from unnecessary delay, train accident, or any other negligence of an employe, provided the negligence is the proximate cause of the added injury to the patient which can be so proved in court. Those who have had much experience in court know that this added injury can very easily be proved to the satisfaction of a jury.

With this legal situation in mind, one can now clearly see why many fractures are transported to a railway hospital for treatment. Many times in no other way can a corporation protect itself from gross injustice. The false statements of the patient at trial, perhaps a year, or two years after injury, coupled with doctored x-ray negatives, perjured statements of physicians, the impossibility in some states of compelling examination of the patient, x-ray or otherwise, and the bias of most juries, make any other course hazardous to the corporation. Yet with transportation of all fractures to the railway hospital, competent treatment, careful x-ray examination, clear records, and preservation of all facts, the railway company (and certainly the patient) receive a "square deal," in better functional results, and in compensation.

So, in conclusion, let me draw your attention to the undoubted fact that both legal and surgical evidence point strongly to the advisability of centralizing all fracture cases in railway practice.

DISCUSSION (*Abstract*)

Dr. J. M. Burke, Norfolk, Va.—I agree with Dr. Chace that all forms of fractures, wherever it is possible, should be centralized in a hospital.

As to the legal points that he has brought out, I hardly think it is within the province of the railroad surgeon to say whether or not the railroad is responsible. We must treat the patient with everything at our command, to the best interest of the patient, first, and the railroad or corporation, as the case may be, thereafter.

Dr. R. A. Woolsey, St. Louis, Mo.—The important phase of Dr. Chace's paper is adequate immobilization for the transportation of fractures. Immobilization is a large order and must include the contiguous joints. I had a patient with a fracture of the surgical neck of the humerus sent in a number of hundred miles with a very heavy plaster cast down to the web of the thumb, which stopped at the axilla about one inch below the site of fracture. I believe you will agree that the patient did not have adequate immobilization.

Another man was sent in one hundred and seventy-five miles, put on the train, and immediately after the dressing complained of great pain. The division surgeon was wired to meet the train. By the time he met it the pain had ceased, and the patient said he was all right. He came on in to the hospital. The dressing was immediately removed. The third day following the hand literally dropped off at the wrist from moist gangrene.

The important phase of this paper is adequate and proper immobilization of fractures for transportation.

Dr. Chace (closing).—As Dr. Burke said, the patient should be considered first and the railroad second. It was for that reason that I discussed the care of the patient first and legal points second. However, since the surgeon does not always know exactly where he stands, or just what to do, I thought it might be well to discuss the legal points.

Dr. Woolsey is accurate about adequate immobilization. You can overdo and you can underdo it, but be sure to do it right.

INFECTIOUS-TOXIC PSYCHOSES: STUDY OF THIRTY-SIX CASES*

By JAMES N. BRAWNER, M.D.,
Atlanta, Ga.

Most frequently the infectious-toxic psychoses are classed as infectious-exhaustive and sometimes as infectious deliria. The term infectious-toxic, however, is probably more descriptive of the condition, especially from an etiological standpoint. It is also true that many patients do not show severe symptoms of exhaustion and many are not delirious, but are merely hallucinated or delusional; or, the symptoms may be those of melancholia. It may be stated, however, that about 50 or 60 per cent, of such patients are confused and are disoriented as to space and time.

Most text-books and articles on insanity written before 1915 barely mention the infections, excepting syphilis and influenza, as a causative factor in the psychoses, though many do state that some of the chronic infections, including tuberculosis, create a toxin which damages or poisons the brain cells and thereby produces various mental symptoms, such as hallucinations and delusions. I mention this to show that as late as ten or twelve years ago most of the outstanding psychiatrists throughout the world, paid very little attention to the infections as an etiological factor in mental diseases. As early as 1900, however, Henry J. Berkely, of Baltimore, called attention to the infectious-toxic psychoses. He said:

"No doubt there are toxic psychoses, due to poisons generated by streptococci, staphylococci, *Bacillus coli communis* and *Bacillus lanceolatus;* and our knowledge is sufficiently accurate to know that certain insanities are the result of the effect of bacterial toxin on the cerebral pulp; and it seems probable that further research along these lines will lead us to look upon not a few of the mental diseases as only a part and parcel of the reaction of the general organism to these poisons and to treat them accordingly with a larger hope of success".

At that time Berkely also wrote about the pathology of the cortical nerve cells, and correlated the changes found with mental symptoms presented by the patient. He did much to put psychiatry on a sound basis and he did not overlook the damaging effect of direct infection in the brain, or of the effect of toxins from infections in other parts of the body.

Memminger has reported over one hundred post-influenza psychoses. In concluding his article he states:

"There are outstanding features in the analysis made of the data pertaining to post-influenzal psychoses of the schizophrenic type:

(1) Schizophrenia was relatively the most frequent psychiatric syndrome; (2) it occurred with and without evidences of hereditary taint or predisposition; (3) most of the cases so diagnosticated made more or less complete recoveries".

The relation of focal infections, especially of the tonsils, teeth, intestines, pelvis of the kidney and bones to the acute and chronic psychoses, is certainly very interesting and is deserving of all the study that is being given the subject. We know how many kidney and heart diseases are due to infections localized in some other part of the body; also the damaging effect of direct infection of the brain in syphilis and encephalitis and we are learning to correlate mental symptoms with pathological, chemical and electrical changes in the cortical cells.

During the past seven years I have treated, in hospitals, 471 acute and chronic psychoses. Thirty-six of these cases, or about 7.5 per cent, were diagnosed "infectious-toxic psychosis". In each case the diagnosis was made after a fairly thorough survey, the location and nature of the infection being given careful consideration. In some of the patients, it is probable that there was also a metastatic infection of the cortex of the brain. Some of these encephalitic cases showed a moderate increase in cells and globulins in the spinal fluid. They also showed, especially after several weeks, marked exaggeration of the deep reflexes. When the brain becomes directly infected the prognosis for a complete recovery, in my experience, is not good, since some permanent organic change in the cortex is likely to occur. In this classification I have excluded all cases of epidemic encephalitis and syphilis.

Location of Infection.—The location and nature of the infection in the thirty-six cases were as follows:

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*Read in Section on Neurology and Psychiatry, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

Pelvis of kidney, 3;
Roots of teeth, 6;
Roots of teeth following extraction, 4;
Tonsils, 7;
Antrum, 1;
Dengue fever, 1;
Osteomyelitis, 2;
Influenza, 5;
Gonorrheal arthritis, 1; and
Uterus and ovaries 6.

Of these thirty-six cases, twenty showed symptoms of confusion and disorientation, and on an average the confusional state lasted six weeks, after which recovery was rapid. So far as I have been able to determine, none of the patients who recovered has ever relapsed. Eighteen of the confused patients recoverd completely and two died. Two patients showed symptoms of dementia precox, which lasted for several months, but both recovered. There were eight who were hallucinated and, as a rule, there were delusions based on the hallucinations. Four patients showed symptoms of what is commonly called melancholia. The hallucinated cases, or those showing symptoms of dementia precox or melancholia, did not show signs of severe exhaustion.

Practically all such patients, especially during the first two or three weeks of the disease, have some fever, from 99 to 100° and the pulse is usually faster than normal. After the first two or three weeks the temperature, as a rule, becomes normal. When the other factors which might produce a psychosis, have been eliminated, a slight rise in temperature is a strong indication that there is a low grade infection going on somewhere in the body.

Etiology.—When we take into consideration the frequency of the infection of the kidneys, teeth and tonsils and a rarity of the psychoses due to these conditions, the question naturally arises, why is it that, in some persons, these infections produce a mental breakdown and, in others, they do not? Two hypotheses may be formulated: first, some persons, on account of their hereditary make-up, are especially susceptible to the effect of all toxins and germs and are liable to break down mentally when they become infected; Second, a specific toxin, which has a selective affinity for the brain cells, is formed, thus causing the acute or chronic psychosis. The sudden and rapid recovery, in the majority of these cases, suggests an immunizing process similar to that which takes place in the acute infections. It is entirely possible that these patients are cured by the formation of an antibody which neutralizes the toxins. The following three cases, which I will report briefly, show the importance of being on the look-out for infections in acute mental breakdowns.

Case 1.—Mrs. J. was a white woman, 36 years old, married. She had had no children or miscarriages. The family history was negative, except that she was egocentric and thought much about her personal appearance.

In November, 1926, she developed an acute infection of the right forefinger, which was treated by incision and antiseptics. The infection finally involved the bones of the finger and amputation was necessary. A few weeks later she developed a psychosis, showing symptoms of agitated melancholia. When I was called to see this patient, her temperature ranged from 99 to 100° and her pulse from 100 to 120. The deep reflexes were markedly exaggerated. The Wassermann was negative. The blood culture showed a streptococcus of the same appearance and cultural characteristics as the streptococcus that had been previously grown from the wound in the finger and from which vaccines had been made and injected into the patient.

The patient's condition remained stationary for a period of about ten weeks, after which she began to improve rather slowly. She is now very much better, though not entirely well.

I am of the opinion that this woman had a mild encephalitis due to a direct infection of the cortex of the brain by the streptococcus circulating in her blood. It is also conceivable that there was a toxin which affected the brain. At any rate, it is plain that the main etiological factor in this case was a streptococcic infection and that the mental symptoms were due to certain pathological changes which occurred in the brain pulp.

Case 2.—A man, age 40, was married, and had two children. The family history was negative. His previous history was negative, except that he had suffered from hemorrhoids for many years. In August, 1927, the patient became melancholic with suicidal tendencies. Later on he became hallucinated and delusional. When he first came under my observation his temperature ranged from 99 to 100° and his pulse from 110 to 125. Upon examination I found he was suffering from hemorrhoids and that he had been constipated for many years. His tonsils were also infected. His reflexes and pupils were normal. The Wassermann was negative. An examination of his urine showed albumen three plus with a few granular casts. His tonsils and hemorrhoids were removed and in a few days his temperature was normal and in four weeks his mind was perfectly clear.

This man had a stable nervous system and there were no hereditary or psychogenic factors in his case. This was clearly a case of an infectious-toxic psychosis.

Case 3.—The patient's family history was negative. His past history showed the usual diseases of childhood, but no serious illnesses of any kind. At the age of thirty he broke down suddenly into a mild confusional and disoriented state. He gradually improved from his acute illness, but later developed symptoms indicative of dementia precox, from which he suffered more than a year.

After he had been under my care for eleven months and his family had been given a gloomy prognosis, he developed a peritonsillar abscess. When he had recovered from the acute infection, I had his tonsils removed. To my surprise, this patient began to improve and in six months he had completely recovered. This happened fifteen years ago and he is still perfectly well. The history of this case shows that probably some of the cases which symptomatically resemble dementia precox are, in reality, chronic infectious psychoses.

Treatment.—Fortunately the majority of the acute cases of infectious-toxic psychoses recover, provided they receive good food and attentive nursing. Apparently when antibodies and bactericidal substances form in sufficient quantities, the patient recovers and frequently the mental symptoms disappear almost suddenly. Accessible foci of infection, however, should be removed. This probably prevents the psychosis from becoming chronic in some cases. It is also important that the infection should be eradicated as early as possible, before there is permanent organic damage to the brain cells. Sound tonsils and healthy teeth should not be removed. If the specific organism can be isolated, vaccines should be made and injected. No doubt this hastens the immunity and thus the recovery of the patient.

CONCLUSIONS

According to the writer's experience, about 7.5 per cent of all psychoses are due to infections, mostly streptococcic. The above classification does not include syphilitic infections, or cases suffering from epidemic encephalitis, though these two diseases were responsible for over 15 per cent of all mental breakdowns treated. About 85 per cent of the patients recover, and in the above series no subsequent attack has occurred. When the brain becomes directly infected, secondarily through the blood stream, encephalitic symptoms appear and a complete recovery is improbable. It is probable that a toxin, with a selective affinity for the cortical nerve cells, is the active cause of the mental symptoms and the cure is brought about by the formation of anti-bodies.

DISCUSSION—*Abstract*

Dr. W. W. Young, Atlanta, Ga.—I am becoming more and more impressed with the importance of this particular etiology. In the proper biological approach to the problems of psychosis every etiological factor must be taken into consideration. There is no one single cause in any given case. However, there is probably one particular circumstance or combination of circumstances which has been the means of precipitating the psychotic reaction. Infection is such a factor in a great number of instances.

Again, in the study of any given psychotic reaction the chief aim should be to ascertain those elements involved which are modifiable and in turn how these may be modified. In this study where evidence of infection exists we have at hand the possibilities for modification and the end results will depend upon how extensive the tissue damage has been.

It is probable that a more complete and painstaking study of all the elements entering into the reaction will reveal that infections are a most frequent determining factor. The type of psychobiological reaction is not a fair index for prognostication. It is probable that many cases of so-called dementia precox relieved by removal of infectious foci were really of the nature of toxic-infectious psychoses. At all events the broader application of the principles of complete biological studies with accent on the modifiable factors and less on the nosological entities will lead to a more hopeful attitude toward "mental" diseases in general.

Dr. Brawner (closing)—I am glad that Dr. Young mentioned in his discussion the personality make-up of some of the patients who break down with an infectious-toxic psychosis. It appears that some people, on account of their constitutional make-up, are more susceptible to toxins than are others and it is entirely possible that this is the main factor in a certain number of these cases.

PROPER DOSAGE OF MORPHIN SULPHATE FOR ORAL AND HYPODERMIC USE*†

By LEON L. SOLOMON, M.D.,
Louisville, Ky.

What is the proper dose of morphin sulphate? Would you say the question is entirely superfluous? With a shrug of the shoulders, would you add that every physician knows the dose of morphin sulphate to be one-fourth grain?

During the years that I taught materia medica I frequently asked the question of my students. Their answers reflected the teaching of other members of the faculty as well as their observation in the hospital wards. Many times I have received just such answers from colleagues. I have sometimes noted a slurring expression, occasionally a petulant air or indignant voice, intended to express lack of interest, if not disgust, with the question.

I have long since proposed to champion the propriety of the wholly unjustified dose of morphin sulphate. One-quarter grain is from four to eight times larger than should be administered if a sum total of good is to be obtained, with a minimum of untoward action. One thirty-

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*From the Records of the Solomon Clinic, Louisville.

†Received for publication November 20, 1927.

second grain is possessed of unquestionable, positive action. When morphin sulphate is exhibited in this small dose, the resultant effect is obtained in the usual time required for the drug to act, beginning in eight to thirteen minutes, followed by an increase in effect for seven to ten minutes, up to a point of its full action which is then ordinarily maintained for the usual space of time, during which morphin exerts all of its power.

It is needless to add that such small dose is not sufficient to control the pain of a gallstone attack or a renal colic. I have in mind, however, the many other conditions in which severe and agonizing pain does not exist and morphin is the agent of first choice. Among such conditions frequently met are:

(1) Ordinary pains and aches, for which other analgesic remedies have not sufficed.

(2) Insomnia, which has resisted the usual somnifacient and soporific drugs.

(3) Nervousness, where anti-spasmodic and nerve sedatives are without effect.

(4) Persistent nausea, not amenable to the ant-emetics.

(5) Shock from various causes.

(6) As a pre-operative dose to assist in avoiding the "shock of surgery" and "shock of the anesthetic."

(7) There are many other conditions where morphin may be advantageously employed in the same small dose.

One- thirty-second grain morphin sulphate in these conditions will often act so amazingly well as to startle you. Not infrequently there will be no necessity to repeat the dose. Where repetition is necessary, the total of morphin administered will rarely exceed two or three such doses.

Many years before the day of the Harrison Narcotic Law, when morphin, easily procured was much more frequently administered than today, I learned to give it in small doses. It was common practice to dissolve the one-fourth grain tablet in eight teaspoonfuls of water, with directions to take one dram, a thirty-second grain, repeating such quantity according to requirements. I was rarely disappointed. As a general rule, not more than two or three such doses were required in a given case to procure complete release from vexatious symptoms.

Where the small dose is used, there is practically entire absence of the several distressing by-effects of morphin common to the quarter-grain dose. There is less likelihood of nausea following the small dose, less likelihood of constipation, of headache and dizziness; there is less diaphoresis, less distressing itching about the nose. And most important of all, that peculiar, subtle, seductive influence of morphin which so often results in making the patient clamor for the drug, keeping him unhappy unless he is under its influence, until he becomes a slave to the requirements of morphin, this most distressing effect of morphin, leading to habit, has never been observed by me where small doses were employed.

For more than thirty years I have used morphin sulphate in this way. One thirty-second grain exhibits the best effects of the drug and the least of its untoward action. Once the physician has learned to use the small dose, the conviction will come to him that one-fourth grain is fully four times, often eight times, as much as might well have been employed.

The last several editions of the U. S. Dispensatory indicate the dose of morphin sulphate to be one-twelfth grain, and the U. S. Pharmacopeia makes official one-eighth grain. It is also interesting to note that as early as 1870 the dose of one-fifth grain was recommended.

Concerning the necessity to repeat the dose for the relief of pain, it must be borne in mind that in proportion as morphin antidotes pain, so pain antidotes morphin. It follows, therefore, as suffering is pronounced or prolonged, there arises the necessity to repeat the pain-relieving agent.

The purpose of this communication is to emphasize one fact only: the prince of remedies, morphin in one thirty-second grain dose is unquestionably active in a large majority of cases; and one-fourth grain, one-fifth grain or one-sixth grain is unnecessarily large, often productive of disagreeable results and not infrequently leads to that most baneful of conditions, the morphin habit.

201 East Chestnut Street.

PSEUDO-TUMOR OF THE BRAIN*

By A. G. JACOBS, M.D.,
Memphis, Tenn.

You see before you the patient, who is a straight, strong, well-built young fellow 13 years old. I have known him all his life and he has been through the usual diseases of childhood. He is a splendid exemplification of a pseudo-tumor of the brain. "Pseudo" means false; "pseudo-tumor" means a false or no tumor of the brain, and that is what he had.

On March 13, 1927, I first saw this boy at his home. Three days before he had been taken suddenly ill, with pain on the right side of the abdomen, rigors and fever. The pain disappeared after a laxative, but the fever continued. My examination disclosed a well nourished, well built boy, with a temperature of 103° F., pulse 90, respiration 28. He had a slight nasal discharge, congested conjunctivae, and a reddened pharynx. The lungs were normal. There was a slight systolic murmur at the base of the heart; the pulse volume was strong. Two days later he developed severe frontal headache, with vomiting, and Dr. Shea was called to examine the sinuses. We feared some sinus involvement because of the terrific frontal pain he was experiencing. It required one-eighth grain of morphin to relieve the headache. The temperature and pain continued and the following day a spinal puncture was done, 10 c.c. of clear fluid, under pressure, being withdrawn. The fluid gave a 1 plus globulin reaction and showed ten cells per c.c.

In addition to the frontal headache and fever there was a double Babinski, a slow pulse (48), and bilateral choked discs. Dr. Semmes saw him with me, and he was then sent to the hospital. The temperature at that time was 102° F., the pulse 48, and respiration was 20. There was occasional vomiting, intense headache over the top of the head, and pain in both eyes. Blood examination showed 6250 leukocytes, 80 per cent polymorphonuclears, 16 per cent lymphocytes, 4 per cent large mononuclears. The urine was negative.

He was given a laxative, put on a liquid diet, and it was necessary to give one-twelfth grain of morphin every four hours to quiet the headaches.

The headache disappeared three days after his admission to the hospital. The pulse rose from 48 on March 18 to 66 on March 23, and to 70 on March 24. The temperature fell to normal on March 18, and he was discharged much improved on March 23.

The outlook on the third day in the hospital was very unfavorable, and in the face of the violent headache, double Babinski, bilateral choked discs and pulse of 48, we feared brain tumor. The following day he passed 100 c.c. of clear urine, appeared brighter and had less pain. We then determined as accurately as possible the fluid intake and output. On March 20 the intake was 53 ounces, output 33 ounces; on March 21, the intake was 43 and output 55; on March 22, the intake was 45 and output 93 ounces. With the free passage of fluid the pulse rose in rate and all the symptoms subsided.

The three conditions which appeared most likely to be responsible for his trouble were, first, brain tumor or abscess; second, meningitis; third, toxic cerebral edema. Indicating brain tumor were the violent headaches, slow pulse, double Babinski and choked discs. However, the history of chills and high fever, combined with muscular pain and coryza immediately preceding this condition, suggested a more acute toxic condition. Opposed to the diagnosis of meningitis were the spinal fluid findings, which were practically negative. Indicative of toxic cerebral edema was the preceding influenza, with the fever, rigor and coryza, followed by the violent headache, which was found not to be due to the sinuses. The choked discs, double Babinski, and the slow pulse indicating internal pressure, all point to a compression of the brain.

The immense relief from symptoms following the free passage of large quantities of urine, which dehydrated the brain, further strengthens this view. We must consider the polyuria as probably resulting from some irritation, either toxic or mechanical, of the pituitary gland.

Under the circumstances we feel justified in considering this a case of toxic cerebral edema following influenza.

*Clinic, Clinic Session, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

THE ORGANIZATION AND ACCOMPLISHMENTS OF THE MEMPHIS PHYSICIANS' BUSINESS BUREAU, INCORPORATED*

By H. B. EVERETT, M.D.,
Memphis, Tenn.

We have in the City of Memphis an organization founded, owned and controlled by the physicians of the city which is known as the Physicians' Business Bureau, Incorporated, which became effective in February of 1919. Previously we had the same difficulty that others have had with commercial collection agencies. Many times they collected our bills and then it was about as hard to get our money from them as from the patients. We did not organize in connection with the local medical society because the Bureau was to be purely a business concern. We organized with a capital of $2000.00, the shares being $10.00 each.

*Read in General Session, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

In 1919 we did little except perfect our organization and sell a few shares of stock. During the years 1920 and 1921 we were affiliated with the local Retail Credit Men's Association and the Merchants' Credit Association, to which we paid dues of $3.00 per month, results being unsatisfactory. In 1922 we decided to do our own collecting.

Our Board of Directors consisted of nine men elected by and from the stockholders. A manager was employed, also collectors, stenographers and then our own attorney, and soon a deputy sheriff to serve legal papers. A fee of $18.00 per member was at first charged for the purpose of getting out a rating book, some one hundred and ten physicians contributing. After that year the rating book and the $18.00 fee were discontinued. However, later we allowed the dentists to affiliate with us, they paying an entrance fee, since they had not helped to build up the organization.

About this time there was some criticism in the courts about organizations operating with not enough percentage of the capital stock sold, so we issued share for share of stock to each member. We have paid no dividends, but have a comfortable surplus to provide for emergencies.

The bills are sent to the office by members, then turned over to the collection department, and if necessary to our deputy sheriff. All stock is owned by members in good standing of our local medical society. No layman has anything to do with the organization except as employe. Our office is in the business section of the city and easy of access to clients and physicians. Our collection charges average 22 per cent. The minimum is 15 per cent. All employes are bonded. All checks are countersigned by the President.

A contract is made with each individual member so that he knows exactly what he will get if the bill is collected. In making our bills we find it well to include both husband and wife. Sometimes it is well to make a joint account, as it is easier to effect a settlement.

Since our beginning in May, 1922, we have collected and distributed to the profession in Memphis as follows: From May, 1922, to the following January, $31,383.00; in 1923, $74,-094.00; in 1924, $94,830.00; in 1925, $111,-006.00; in 1926, $132,498.00; and to this time in 1927, $85,888.00; a total since we have been in operation of $529,700.00. If we consider that these accounts were turned over to the Bureau after the physician had failed to collect, many of them being out of date, this is rather an impressive showing.

We at any time give our members any information we have in the office. We have accurate information on every account we have handled in the office, amounting to approximately 75,000. Members are sent checks for the amount due them the first of every month. In conclusion, to sum up, a bureau such as ours is very profitable for the profession, for it collects where the physician has failed and the commission charged is very reasonable. One necessary thing is the cooperation of the profession.

It removes the most unpleasant duty of our profession, the collection of bad accounts. The most pleasant feature connected with the members of the Bureau is that unexpected check on the first of the month.

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DR. M. Y. DABNEY, Editor
C. P. LORANZ, Secretary-Manager

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EDITORIAL DEPARTMENT

SYNTHALIN

The termination "in" as in insulin, heparin, pituitrin, estrin, epinephrin, the usual hormone suffix, is being attached to an increasing number of substances popular in medicine. Synthalin is a drug, decamethyl diguanidine, synthetized by Frank in Breslau, and claimed to reduce markedly the blood and urinary sugar of depancreatized dogs. It has also been fairly widely tried in cases of diabetes. It may be taken by mouth; its effect upon the blood sugar is less sudden than that of insulin; and if it substitutes efficiently for insulin it would of course be of great value to diabetics. The unpleasantness of daily hypodermic injections of insulin, and their sometimes damaging local effects are known.

Ringer, Biloon, Harris, and Landy,[1] have reported detailed studies of the effects of synthalin administered to four diabetic patients, and to rabbits.

A diabetic girl of 13 was kept sugar free during five months on synthalin without insulin. She was at first unable to take the drug without diarrhea and vomiting. Her tolerance for it apparently increased, however, till she was able to ingest the necessary amount. Later when she was again put upon insulin, more of this drug was necessary to keep her sugar free than before the synthalin regime. Another more severe case in the practice of the same men was less benefited by synthalin. It was used in two other milder cases. In all four, the sugar output was reduced though less dramatically than by insulin. Ketonuria regularly disappeared, and there was an improvement in protein metabolism. A number of normal rabbits which received large doses of synthalin, from 25 to 100 mg., showed a reduced blood sugar, and in spite of the administration of intravenous dextrose most of them died. Others received 5 mg. without a notable effect upon their blood sugars.

David[2] of Berlin, in an article upon synthalin and liver damage reports the case of a young man whose blood sugar was at one period of treatment with synthalin notably lowered. During a later hospital stay, synthalin was again tried, but it entirely failed to reduce the blood sugar.

The results of synthalin therapy are undoubtedly rather variable, and the factors which influence its activity are at present unknown. There is evidence to show that even though the urinary sugar of the patient may be temporarily lowered by synthalin, and weight may be gained, lasting benefit is not obtained. Synthalin may not be used with assurance for a great length of time as a substitute for insulin, though as the Baltimore workers have remarked, it is certainly a step in the right direction.

1. Ringer, A. T.; Biloon, S.; Harris, M.M.; and Landy, A.: Synthalin: Use in the Treatment of Diabetes. Arch. Int. Med., 41: 453, Apr. 1928.

2. David: Synthalin und Leberschadigung. Deutsche Med. Woch. 54: 473, Marz, 1928.

KNOCK KNEE AND FLAT FOOT

Statistics compiled from the draft during the recent World War have been often quoted, and have thrown much light upon remediable conditions in persons of the draft age in the United States and elsewhere.

This great emergency revealed the large number of men unfit for mental or physical strain, who were yet able to plod along doing their daily civilian tasks. The number of countries with a republican form of government has increased since the War. Government then, on the whole, is better for the average man since this calamity. If the health of the population of America improves along the lines indicated to be necessary by draft figures, another benefit from the War will be established. However, there is no assurance that this is occurring.

"Among the first million men to be mobilized during the World War, one rachitic deformity, flat foot, was found to be practically as frequent (one hundred and seventy per thousand) as all other diseases and deformities combined (one hundred and eighty per thousand.)"[3]

3. Moore, C. U.: Rickets of the Lower Extremities. Jour. Bone & Joint Surg., 10: 96, Jan. 1928.

Recent statistics from colleges and naval recruiting stations indicate a prevalence of flat foot still in the population today. Examination of school children in Oregon showed that less than ten per cent were entirely free from it.[3]

There is a prevalence of rickets among the young and adult population today. Medical photographs of children with rickets usually show flat foot. Hess[4] believes that associated with the bony deformities of rickets there is generally a marked laxity of the ligaments of the knee joint and bones of the foot, which is conducive to flat foot and knock knee but that rickets is not the sole cause of flat foot.

The conditions are, according to Moore of Portland, Oregon, intimately related to rickets. Moore shows photographs of two puppies, litter mates, one rachitic through diet and the other by diet normal. The rachitic animal had notably enlarged and angular epiphyses and flattened feet upon which he unresistingly sank. The normal dog was more on his toes. Rickets in the puppy results in a looseness of joints of the knees and bones of the foot as may be shown roentgenographically. When weight is imposed upon these, the condition in the knees results in genu valgum, or knock knee; in the feet, in the fallen arch.

Roentgenograms of children with rickets exhibit a comparable condition, improper apposition of the bones in the knees permitting a decided lateral mobility. In early rickets, Moore believes, the weight of the body causes the joint lines at the knee to form an acute angle instead of being parallel. Lateral mobility at the knee, which is often the first sign of leg rickets in children, may be measured and corrected, in many instances, by orthopedic appliances.

The skeletal signs of rickets appear in the various bones at the time of their most rapid growth. "Consequently the chief manifestations during the first six months of life are in the flat bones of the chest as in costomalacia, rosary, and Harrison's groove; during the second year, in the extremities as enlarged epiphyses, genu valgum or varum and pes planus."[3]

Foot and knee deformities should occur less frequently if well established knowledge of the anti-rachitic regime in childhood were applied.

4. Mess, A. A.: Rickets. Abt's Pediatrics, 2:907, W. B. Saunders Co., 1923.

PURIFICATION OF HEPARIN

The synthesis of new preparations for medical use has progressed rather vigorously since the days of Ehrlich's six hundred and sixth compound. The last fifteen years have seen the development of many new bismuth, arsenic and other preparations for the treatment of syphilis and spirochetal infections. The domination of the therapeutic field of the present, or perhaps one should merely say of the very near future, falls not to synthetic chemical compounds, of known definite formula, but to the so-called biologicals: extracts of immune sera and of various animal organs. The value of animal immune sera, such as diphtheria and tetanus antitoxins, in the eradication of human infectious disease is everywhere admitted, as are the possibilities of further purification of their active components.

A fairly large group of animal organ extracts is now used medicinally. Examples are insulin, thyroid and parathyroid extract, adrenalin, pituitrin, the liver extract used in pernicious anemia, and other liver extracts. Research has been in the main more successful in the separation and analysis of physiologically useful portions of a living tissue from surrounding inactive or counteractive substances, than in building up from the atoms of chemistry molecules of beneficial drugs. Biochemistry has not yet reached the synthetic stage, though it may be headed that way.

The number of physiologically active substances obtainable from the liver shows no signs of abatement. Seventy, more or less, different functions have been assigned to the liver, and there is no reason to forbid the hope that eventually a hormone to expedite each of the seventy may be isolated in a fairly pure state.

Heparin[1] was prepared from the livers of dogs and from other tissue in 1918. It is a substance which prevents the coagulation of blood, either freshly shed or in the veins, and has been studied extensively by Howell during the last several years.

Howell's[2] theory of blood coagulation is well known to the average medical student, practitioner, and trained nurse, since it is a favorite examination question for all three. Briefly, it assumes that a substance held in combination in

1. Howell, W. H.: Purification of Heparin. Its Chemical and Physiological Reactions. Bull. Johns. Hop. Hosp. 42:199, April 1928.

2. Howell, W. H.: Physiology, Ninth Ed., W. B. Saunders Co., 1924.

normal blood, prothrombin, is released in shed blood in the presence of calcium to become thrombin, which activates fibrinogen to become fibrin with the resulting clot. Prothrombin in the veins is prevented from changing into thrombin and initiating clot formation by the presence of an inhibitory substance, anti-prothrombin. Tissue extract neutralizes this substance and permits blood clotting.

Leeches, ticks, and other blood sucking animals secrete a substance which prevents the coagulation of blood. This material has been prepared from the salivary glands of the leech under the name hirudin; and hirudin is very effective in preventing clotting when mixed with freshly shed blood, or when injected into the circulation of the living animal.

Heparin, a more powerful anti-coagulant than hirudin, has been further purified by Howell.[1] He now reports a substance which shows constant chemical reactions, is non-toxic, stable on boiling, free from nitrogen and phosphorus, although in earlier studies he considered it a phosphatide, and in recent dictionary definitions it is phosphatide.

One milligram of heparin prevents the coagulation of 100 c.c. of human blood. It is considered to be a carbohydrate, probably a glycuronic acid compound, containing calcium and sulphuric acid, and is classified as an anti-prothrombin. The intravenous injection of 1 mg. of heparin per 50 c.c. of estimated blood into a dog makes its blood incoagulable for 30 minutes. During the first hour or two after injection the animals exhibited hemophilic oozing from skin wounds made in exposure of the blood vessels. Samples of blood were removed for study. An hour after injection coagulation began to return, and three hours after, clotting was practically normal.

Heparin was used as an anti-coagulant in blood transfusions in ten patients. Blood from the donor was allowed to run into saline containing heparin, then into the recipient. Eight of the cases had no reaction. In two there were chills and elevation of temperature one to two hours after transfusion.

Heparin[3] has been used in the prevention of anaphylactic shock in pigeons and guinea pigs, with reported success. Death in anaphylactic shock is considered to be due to the formation of blood clots, which in a majority of the animals observed was prevented by injection of heparin before the shocking antigen.

Purified heparin may perhaps become useful as a substitute for the oxalic acid salts commonly employed in prevention of coagulation of samples of blood drawn for chemical laboratory examinations.

Hemophilia has been considered by Howell and Cekada[4] to be due to an abnormality of the blood platelets which makes them more than usually stable. That a superfluity of heparin or a similar substance is present in hemophilia has not been determined. It is a tissue extractive, small quantities of which have a constant effect upon man and the lower animals. Its place in medical practice is to be proven.

3. Williams, O. B. and Van de Carr, F. R.: Effect of Heparin on Anaphylactic Shock in Guinea Pigs. Proc. Exp. Biol. Med. 24: 798, May 1927.

4. Howell, W. H.; and Cekada, E. B.: Cause of the Delayed Clotting of Hemophilic Blood. Amer. Jour. Physiol., 78:500, Nov. 1926.

Asheville—Where We Meet

ASHEVILLE: A POPULAR CONVENTION CITY*

In 1927 Asheville was host to nearly eighteen thousand delegates who attended conventions held in the city during the year. Eighty-seven national, sectional or state organizations staged their annual gatherings in Asheville during this period. The central location of the city in the Land of the Sky, coupled with the beautiful scenic surroundings and the opportunity offered for sports and recreation, have been contributing factors in making Asheville a popular city for conventions.

Located on a high plateau twenty-three hundred feet above the level of the sea, Asheville is blessed with an excellent climate. The mountains which surround the city are famous for their beauty and unique, scenic interest. Nearly half a century ago a noted novelist, after witnessing the glories of a mountain sunset and watching the rising cloud-like mists of a mountain dawn, applied to this region the name that is most familiarly associated with it, the "Land of the Sky".

The altitude of Asheville induces cool summers. The sheltering mountain ranges protect the city and surrounding region from severe winter storms. Due to this optimum in climatic conditions, Asheville has gained an international

*By John D. Topping, Publicity Director, Asheville Chamber of Commerce, Asheville, North Carolina.

reputation as a year round playground. Four good golf courses, facilities for tennis, horse back riding and other sports are among the attractions which bring thousands of visitors annually to this mountain region.

Asheville has ample hotel facilities for the entertainment of convention guests. The hotels of the city are open at all seasons and provide a sufficient number of rooms for large gatherings. At one time in 1927, twenty-four hundred delegates to two large conventions were provided with hotel accommodations.

The Asheville hotels are modern in every respect and offer a variety of service. Modern commercial hotels, resort hotels and luxurious inns are at the disposal of the visitor in the city. Part of the hotels are operated on the European plan, while others offer the American plan of accommodations.

Grove Park Inn has long been internationally famous as one of the most unique resort hostelries in the world. Built entirely of grey fieldstone, this great inn overlooks the golf course of the Asheville Golf and Country Club and is surrounded by attractive gardens. The view of the mountains from the terraces of the Inn is wonderfully attractive. Possibly the most distinctive features of the Inn are the immense open fireplaces in the lobby where huge logs are burned during the cooler months of the year. The lobby is also the location for one of the world's greatest organs. Organ concerts are a feature of the entertainment of guests at the Inn.

Asheville's uptown hotels include: the Battery Park, the George Vanderbilt, the Asheville-Biltmore, the Langren, the Swannanoa-Berkeley and the Jenkins. The Battery Park Hotel is located on a site where a mountain once stood. When the old Battery Park Hotel was torn down recently, the mountain was removed to make room for a number of modern structures including the new Battery Park Hotel. All of the uptown hotels offer every convenience to guests. These hotels are operated on the European plan.

Kenilworth Inn, located a short distance from the center of the city, is another nationally known hostelry. This Inn is one of the largest in the region and is the site for annual festivals and social events. In the large ball room are held each year the Historical Ball, the Rhododendron Ball and other affairs which draw to Asheville visitors from all sections of the country.

The center of the City of Asheville, viewed from the slopes of Beaucatcher Mountain.

Two other American plan hotels are available to the convention guest in Asheville. The Manor, an English type of inn, is attractively located in the Grove Park section. This inn is popular at all seasons. The Princess Anne is open all the year and offers American plan service to guests.

Many convention delegates motor to Asheville. The highway connections leading to this city from other parts of the country are unusually good. Asheville is located at the intersection of a number of national highways and is the center for a network of paved state highways which lead the motorist through the beautiful scenery of the Land of the Sky. The Buffalo Trail, the

Dixie Route A, the Appalachian Scenic Highway, the North South Short Route and a number of national highways enter Asheville from the North while the extension of these same highways and other federal routes connect the city with all parts of the South.

Pullman connections into Asheville are available from all directions and rapid service is maintained. Four lines of the Southern Railway serve the city and provide rail connections with the east and northeast, the middle west and the south and southwest.

Through years of playing the host to visitors, Asheville has gained valuable experience in the methods of entertaining large conventions and gatherings. Delegates leave the city with a lasting memory of the cordial reception extended to them in the Land of the Sky.

Book Reviews

Pharmacotherapeutics, Materia Medica and Drug Action. By Solomon Solis-Cohen, M.D., and Thomas Stotesbury Githens, M.D. 2009 pages. New York: D. Appleton and Company, 1928.

In this work the authors endeavor to present not only materia medica and pharmacology but therapeutics as well. Their viewpoint is that of the practice of medicine. Therefore, this volume lends itself to practical use by the practitioner of medicine. It incorporates practically all of the advances that have been made up-to-date in the fields of materia medica and pharmacodynamics.

Its thorough index enables one readily to find any drug, its action, uses, toxicity, etc. The index alone takes up 138 pages.

This work of Dr. Solis-Cohen and Githens is monumental in the field of pharmaco-therapeutics; and exhaustive in its scope. It should be of inestimable value to the practitioner and student of medicine.

The Mechanics of the Digestive Tract. By Walter C. Alvarez, M.D., Associate Professor of Medicine, University of Minnesota (The Mayo Foundation). Second Edition. 447 pages with 100 illustrations. New York: Paul B. Hoeber, 1928. Cloth, $7.50.

The physiology of the gastro-intestinal tract is well covered, and following this the pathological deviations. As in the former edition the author stresses the importance of the myogenic nature of rhythmic contractions, but does not disregard the neurogenic factors in control and coordination.

Where he differs with other investigators, their data and opinions are always given in full.

The chapters devoted to the gradients are particularly well expressed. The book is conservative in tone. It is not too technical to be read by the average physician nor too elementary to be studied by investigators. The present edition is more than a revision as its scope is broadened. The extensive bibliography and author's index are real assets.

Handbook of Diseases of the Ear. By Richard Lake, F.R.C.S. Eng., Consulting Surgeon, Royal Ear Hospital (University College Hospital); Duvern Lecturer in Otology, University of London, and E. A. Peters, M.D., Cantab., F.R.C.S. Eng., Surgeon, Royal Ear Hospital (University College Hospital) 310 pages, illustrated. Fifth Edition. New York: William Wood and Company. Cloth, $4.00.

This book although, according to its author, rewritten and brought up-to-date, will not meet with the entire approval of the advanced otolaryngologist, since it contains much obsolete material carried over from the former editions. For instance, there are the various nose and throat operations which the author advises for the relief of otosclerosis. Modern otolaryngologists are agreed that otosclerosis is not a type of catarrhal otitis media.

The author goes entirely too far in his recommendations of the radical mastoid operation for the relief of chronic ear conditions.

The reviewer takes issue also with the author in his statement that nystagmus caused by the use of a syringe in chronic suppurations is a dangerous condition and calls for operative treatment.

In the chapter on minor operations are described operations on the tensor tympani muscle, division of the posterior fold of the membrane, division of the anterior ligament of the malleus and division of the stapedeus for the relief of deafness. These have all been tried and without exception have been found wanting.

Modern Methods in the Diagnosis and Treatment of Renal Disease. By Hugh MacLean, M.D., D.Sc., F.R.C.P., Professor of Medicine, University of London, and Director of the Medical Clinic, St. Thomas' Hospital; Honorary Consulting Physician to the Ministry of Pensions; Consulting Chemical Pathologist to St. Thomas'. Hospital. Third Edition, revised and enlarged. 135 pages with 4 colored plates. Philadelphia and New York: Lea and Febiger, 1927. Cloth, $2.75.

The new material added to diagnosis and treatment brings the present edition of this book up-to-date and in accord with the present literature on nephritis. The four plates added are excellent portrayals of Dr. McLeans' classification of nephritis.

The important parts of the voluminous literature on nephritis are well presented.

Asthma, Its Diagnosis and Treatment. By William S. Thomas, M.D., Associate Attending Physician in Immunology, St. Luke's Hospital, New York. 379 pages, ilustrated. New York: Paul B. Hoeber, Inc., 1928. Cloth, $7.50.

This book can be readily recommended to the physician who has only occasional cases of asthma and wishes to familiarize himself with some of the procedures actually in vogue in its treatment.

Its errors are largely those of omission. It does not deal with theories but Dr. Thomas' idea is evidently to state ideas accepted as fact by the majority of workers.

It may be read in a few hours by the average reader, and contains few typographical errors. It contains little of practical value, however, to the man doing this type of work who makes any attempt to keep up with the literature.

Diagnosis and Treatment of Diseases of the Stomach with an Introduction to Practical Gastro-Enterology. By Martin E. Rehfuss, M. D., Assistant Professor of Medicine at Jefferson Medical College. Octavo Volume of 1236 pages with 519 illustrations, some in colors. Philadelphia and London: W. B. Saunders Company, 1927. Cloth, $12.00.

The above publication is the outstanding recent contribution to medical literature on diagnosis and treatment of diseases of the stomach.

The unusual opportunity for study and observation which the author has had at home and abroad, and the cooperation of a large group of specialists made possible this unique volume.

The method by which Dr. Rehfuss has carefully outlined diagnostic procedure and therapeutic technic makes this book of inestimable value to student and physician alike. His tables of food values, diets, and suggestions as to the management in general of the various gastro-intestinal disorders, add considerably to the book's value.

Bedside Diagnosis. By American Authors, edited by George Blumer, M.D., Clinical Professor of Medicine, Yale University, School of Medicine; Attending Physician to the New Haven Hospital. Three Octavo volumes, totalling 2820 pages, containing 890 illustrations. Philadelphia and London: W. B. Saunders Company, 1928. Cloth, $30.00 a set. Separate desk index volume free.

The purpose of these volumes is to stress the importance of physical diagnosis in the investigation of disease. Volume 1 is devoted to infections and intoxications, dietary deficiency, physical agencies, metabolic diseases, developmental diseases, locomotive and digestive diseases. The authors are allotted adequate space and have covered their subjects satisfactorily.

Volume II deals with the liver, gall bladder, pancreas, peritoneum, bronchi and lungs, mediastinum, circulatory system, blood, lymph glands, spleen and urinary system. Outstanding is the section on congenital heart disease by Maude Abbott. It is a perfect presentation. Deserving of special mention are the articles by the late C. F. Hoover, on acute edema of the lungs, chronic passive congestion, pulmonary emphysema and atelectasis; the section on angina pectoris by I. W. Gorham; and that on instruments, aids in precision in cardiac diagnosis by William J. Kerr. The section on disorders of the heart beat by Frank N. Wilson is well written but is too technical.

In his article on valvular heart disease Dr. Joseph L. Miller says that the diagnosis of cardiac enlargement can best be determined by the location of the apex beat and that "It is rarely necessary to resort to the x-ray to determine the approximate size of the heart." This statement is too sweeping.

Volume III is given to a consideration of the endocrine system, nervous system, vasomoter system and psychiatric conditions. The space given to the endocrine system is out of proportion. The subject is given in greater detail than seems in keeping with this set. The sections on nervous and psychiatric conditions are well written.

It is to be regretted that foot notes have been added by the editor when he differs from the contributor or wishes to make a statement clearer.

Diseases of the Nose, Throat, and Ear. Edited by A. Logan Turner, M.D., LL.D., F.R.C.S.E., Consulting Surgeon. Ear and Throat Department, Royal Infirmary, Edinburgh, with the collaboration of several others. Second Edition, revised and enlarged. 440 pages with 234 illustrations and 12 plates. New York: William Wood and Company. Cloth, $6.00.

An extensive review of the first edition of this excellent treatise on otolaryngology was presented in these columns two years ago.

In this edition each chapter has undergone revision and some have been rewritten entirely, thus improving what was already a useful work.

The Endocrines in General Medicine. By W. Langdon Brown, M.A., M.D., F.R.C.P., Physician to St. Bartholomew's Hospital. 144 pages. New York: Paul B. Hoeber, 1927. Cloth, $3.00.

Although an enthusiast on this subject the author is more conservative than most writers. The clinical descriptions of endocrine dysfunctions are clear and their diagnosis is such that the average physician can recognize them.

In the sections on treatment too much stress is laid as a rule on the benefits of glandular therapy, but no more than in other books of the same character.

Epidemic Encephalitis (Encephalo-Myelitis). By Leo M. Crafts, B.L., M.D., (Harv.) Formerly Dean and Professor of Nervous and Mental Diseases, Medical Department of Hamlin University, Minneapolis, Minn. 237 pages, 15 figures. Boston: Richard G. Badger, 1927.

Clinical histories are given in the form of case reports. This is a very readable treatise on the subject.

Affections of the Stomach. By Burrill B. Crohn, M.D., Associate Attending Physician to the Mt. Sinai Hospital, New York City. Octavo of 902 pages with 361 illustrations, some in colors. Philadelphia and London: W. B. Saunders Company, 1927. Cloth, $10.00 net.

The earlier chapters of this volume, as would be expected, are devoted to a review of the anatomy and physiology of the stomach. In the chapters given to diagnostic methods the author keeps the practical application of the work before him. The usefulness and limitations of each procedure are clearly shown.

The section on "Radiography of the Stomach," written in collaboration with Samuel J. Goldfarb, is worthy of special mention.

The functional and organic diseases of the stomach and the twenty-seven chapters devoted to ulcer of the stomach and duodenum, the chapter by A. A. Berg on the surgical treatment of gastric and duodenal ulcers, are all deserving of praise. The book supplies a need of the medical profession.

Books Received

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles on Treatment, Medicine, Surgery, Neurology, Pediatrics, Obstretrics, Gynecology, Orthopedics, Pathology, Dermatology, Ophthalmology, Otology, Rhinology, Laryngology, Hygiene, and other topics of interest to Students and Practitioners. By leading members of the Medical Profession throughout the world. Volume I, March 1928. Thirty-eight Series. 307 pages, illustrated. Philadelphia and London: J. B. Lippincott Company.

Elements of Physiology. By Ernest G. Martin, Ph.D., Professor of Physiology in Stanford University, California and Frank W. Weymouth, Ph.D., Associate Professor of Physiology in Stanford University, California. 784 pages illustrated with 133 engravings. Philadelphia: Lea and Febiger, 1928. Cloth, $8.00.

Practice of Medicine. By Hughes Dayton, M.D., Irvington-On-Hudson, New York, Attending Physician to the Grasslands and Tarrytown Hospitals; Consulting Physician to the United Hospital, Portchester, New York. Fifth Revised Edition. 340 pages. Philadelphia: Lea and Febiger, 1928. Cloth, $2.25.

Physical Diagnosis. By W. D. Rose, M.D., Associate Professor of Medicine in the University of Arkansas, Little Rock, Arkansas. Fifth Edition. 819 pages with 310 illustrations and 3 color plates. St. Louis: C. V. Mosby Company, 1927. Cloth, $10.00.

Gynecology for Nurses. By Harry Sturgeon Crossen, M.D., F.A.C.S., Professor of Clinical Gynecology, Washington University Medical School, St. Louis. 281 pages with 365 illustrations and 1 color plate. St. Louis: C. V. Mosby Company, 1927. Cloth, $2.75.

The Use of Symptoms in the Diagnosis of Disease. By Hobart Amory Hare, B.Sc., M.D., LL.D., Professor of Therapeutics and Diagnosis in the Jefferson Medical College of Philadelphia; Physician to the Jefferson Medical College Hospital; Ninth Edition, thoroughly revised. 528 pages with 124 engravings and 4 plates. Philadelphia: Lea and Febiger, 1928. Cloth, $5.50.

Lobar Pneumonia. A Roentgenological Study. By L. R. Sante, M.D., F.A.C.R., F.A.C.P., Associate Professor of Radiology, St. Louis University Medical School; with a foreword by James T. Case, M.D., F.A.C.S., Battle Creek, Mich. 137 pages, illustrated. New York: Paul B. Hoeber, Inc., 1928. Cloth, $3.00.

Pediatrics. Edited by Isaac A. Abt, M.D., Professor of Pediatrics, Northwestern University Medical School; with the collaboration of Arthur F. Abt, M.D., Assistant in Pediatrics, Northwestern University Medical School. Practical Medicine Series, 1928, under the editorial charge of Charles L. Mix, A.M.,M.D., Chicago: The Year Book Publishers. This volume, $2.25. Series of 8 volumes, $15.00.

General Surgery. Edited by Evarts A. Graham, A.B.,M.D., Professor of Surgery, Washington University School of Medicine, St. Louis. Practical Medicine Series, 1927, under the editorial charge of Charles L. Mix, A.M., M.D. Chicago: The Year Book Publishers. This volume, $2.25. Series of 8 volumes, $15.00.

Southern Medical News

ALABAMA

Deaths

Dr. Lancelot Mathews Sanders, Troy, aged 31, died January 14 of pulmonary tuberculosis.

Dr. Armand Pfister Smith, Eutaw, aged 76, died November 7.

Dr. Joseph Hall, Bay Minette, aged 59, died February 2 of angina pectoris.

Dr. Charles W. Williams, Cherokee, aged 80, died January 22 at a hospital in Sheffield, of acute nephritis and hematuria.

Dr. Francis Morris Broach, Ansley, aged 72, died February 6, of erysipelas.

ARKANSAS

The Tri-State Medical Society of Louisiana-Arkansas-Texas met in Shreveport, Louisiana, January 18-19. Dr. Guy A. Caldwell, Shreveport, Louisiana, was elected President; Dr. S. C. Barrow, Shreveport, Louisiana; Dr. M. L. Norwood, Locksburg, Arkansas, and Dr. W. G. Hartt, Marshall, Vice-Presidents; Dr. Frank H. Walke, Shreveport, Louisiana, re-elected Secretary-Treasurer. The next meeting will be held in Texarkana in 1929.

The forty-fourth annual meeting of the Tri-States Medical Association of Mississippi, Arkansas and Tennessee, was held in Memphis February 29-March 1-2. The following officers were elected: Dr. V. B. Philpot, Houston, Mississippi, President; Dr. A. G. Payne, Greenville, Mississippi, Dr. Julius A. Bogart, Forrest City, Arkansas, and Dr. George W. Penn, Humboldt, Tennessee, Vice-Presidents; Dr. A. F. Cooper, Memphis, Tennessee, was re-elected Secretary-General.

Boone County Medical Society has elected Dr. D. K. McCurry, Alpena Pass, President; Dr. J. G. Gladden, Western Grove, Vice-President; Dr. J. H. Fowler, Harrison, Secretary-Treasurer.

Crawford County Medical Society has elected Dr. B. L. Bennett, Van Buren, President; Dr. S. D. Kirkland, Van Buren, Vice-President; Dr. J. A. Wigley, Mulberry, Secretary-Treasurer.

Independence County Medical Society has elected Dr. C. G. Hinkle, Batesville, President; Dr. L. T. Evans, Batesville, Vice-President; Dr. M. S. Craig, Batesville, Secretary.

Lonoke County Medical Society has elected Dr. A. C. Watson, England, President; Dr. W. B. Crowgey, Scott, Vice-President; Dr. Henry Thibault, Scott, Secretary-Treasurer.

Dr. J. P. DeLaney is associated with Dr. J. P. Runyan at St. Luke's Hospital, Little Rock.

Deaths

Dr. K. W. King, Salado, aged 48, died January 21 at Searcy of carcinoma of the liver.

Dr. George Agnew Hennings, Dell, aged 64, died recently at a hospital in Memphis of sepsis, following thrombotic hemorrhoids.

Dr. Pratt P. Ferguson, Blytheville, aged 58, died January 31 in New York, of paralysis.

Dr. Peter Christensen, North Little Rock, aged 70, died November 9.

Dr. William F. Saner, Hope, aged 62, died in a hospital in Dallas, Texas, February 28.

Dr. T. Madison Morgan, El Dorado, aged 42, died March 7.

DISTRICT OF COLUMBIA

The Ladies' Board of the Emergency Hospital, Washington, has awarded a gold medal to Miss Mabel Clark, a recent graduate from the training school for nurses at the Hospital. She saved the life of a delirious patient. The patient in a room on an upper floor of the Hospital became delirious and as Miss Clark entered the room was about to jump from the window. She grabbed him by the foot and called for help. The patient was rescued and left the hospital a few days later in good condition.

After thirty years of distinguished service in the U. S. Army Medical Corps, Col. Bailey K. Ashford was placed on the retired list, February 11. Much of his service has been spent in Porto Rico, where he was President of the Porto Rico Anemia Commission, which, between 1904 and 1910, treated about 300,000 persons for hookworm.

Deaths

Dr. Kenneth Rayner Glennan, Washington, aged 43, died February 6 at the Providence Hospital of pneumonia.

Dr. Edwin W. Patterson, Washington, aged 57, died December 27 at Alexandria, Virginia, of angina pectoris.

Dr. Neil F. Graham, Washington, aged 87, died February 1, of uremia and prostatic hypertrophy.

Dr. James G. Field, Captain, U. S. Navy, retired, Washington, aged 65, died December 8 at the U. S. Naval Hospital of bronchopneumonia and tularemia.

FLORIDA

At the recent annual meeting of the Florida State Medical Association held in Tampa, the following officers were elected: Dr. Fred Waas, Jacksonville, President; Dr. M. A. Lischkoff, Pensacola, Dr. Leland F. Carlton, Tampa, and Dr. G. Walter Potter, St. Augustine, Vice-Presidents; Dr. Shaler Richardson, Secretary-Treasurer, re-elected. St. Augustine was selected as the 1929 meeting place.

Seminole County Medical Society has elected Dr. G. S. Selman, Sanford, President; Dr. C. M. Mitchell, Sanford, Vice-President; Dr. J. T. Denton, Sanford, Secretary-Treasurer.

At the recent organization of the staff of the Alachua County Hospital in Gainesville, Dr. M. H. DePass was elected Chief of the Staff and Dr. J. L. Summerlin was named as Secretary.

The home for the aged and infirm members of the United Brotherhood of Carpenters and Joiners of America, near Lakeland, was expected to be completed in January. The new building will accommodate 400 persons. It was constructed by a per capita tax of 10 cents a month on each member.

St. Vincent's Hospital, Jacksonville, was recently formally opened. The hospital has a capacity of 200 beds and has cost more than one million dollars.

Dr. I. M. Hay has leased the Crenshaw Hotel, Melbourne, which he will operate as a private hospital. He will have associated with him on the hospital staff, Dr. I. F. Bean and Drs. I. K. Hicks, Melbourne.

Dr. R. D. Ferguson has resigned his position with the State Prison Farms, Titusville, and has moved to Ocala where he will do general practice.

Dr. C. W. Bartlett succeeds Dr. E. C. Levy as City Health Officer for Tampa.

Dr. William P. Duncan, Jr., Tampa, and Miss Louise Van Dyke, Atlanta, Georgia, were married December 23.

Deaths

Dr. W. Herbert Adams, Jacksonville, died suddenly March 5 following a brief illness which resulted from an infection of a finger.

Dr. Mary B. Jewett, Florence Villa, aged 69, died February 5 of carcinoma.

Dr. William Erastus Mabry, St. Petersburg, aged 82, died February 12 of chronic myocarditis.

Dr. W. W. Farnell, New Smyrna, died February 22 as a result of injuries sustained in an automobile accident.

GEORGIA

Brooks County Medical Society has elected Dr. J. R. McMichael, Quitman, President; Dr. R. E. McClure, Quitman, Secretary-Treasurer.

Chatham County Medical Society has elected Dr. G. H. Lang, Savannah, President; Dr. H. T. Exley, Savannah, Vice-President; Dr. A. A. Morrison, Savannah, Secretary-Treasurer.

Dooly County Medical Society has elected Dr. H. H. Shipp, Vienna, President; Dr. L. H. Bishop, Unadilla, Vice-President; Dr. F. E. Williams, Vienna, Secretary-Treasurer.

Hancock County Medical Society has elected Dr. H. L. Earl, Sparta, President; Dr. C. S. Jernigan, Sparta, Secretary-Treasurer.

Houston-Peach Counties Medical Society has elected Dr. M. S. Brown, Fort Valley, President; Dr. R. L. Cater, Perry, Vice-President; Dr. E. L. Evans, Perry, Secretary-Treasurer.

Johnson County Medical Society has elected Dr. H. B. Bray, Wrightsville, President; Dr. T. L. Harris, Wrightsville, Vice-President; Dr. J. G. Brantley, Secretary-Treasurer.

Morgan County Medical Society has elected Dr. W. M. Fambrough, Bostwick, President; Dr. W. C. McGeary, Madison, Vice-President; Dr. D. M. Carter, Madison, Secretary-Treasurer.

Ocmulgee Medical Society has elected Dr. E. C. Brown, Hawkinsville, President; Dr. E. L. Smith, Eastman, Vice-President; Dr. A. R. Bush, Hawkinsville, Secretary-Treasurer.

Polk County Medical Society has elected Dr. C. W. Peek, Cedartown, President; Dr. W. G. England, Cedartown, Vice-President; Dr. P. O. Chaudron, Cedartown, Secretary-Treasurer.

Spalding County Medical Society has elected Dr. T. I. Hawkins, Griffin, President; Dr. C. F. Griffith, Griffin, Vice-President; Dr. H. J. Copeland, Griffin, Secretary-Treasurer.

Talbot County Medical Society has elected Dr. J. E. Peeler, Woodland, President; Dr. W. P. Leonard, Talbotton, Vice-President; Dr. C. C. Carson, Talbotton, Secretary-Treasurer.

Thomas County Medical Society has elected Dr. Mary J. Erickson, Thomasville, President; Dr. Agnew Andrews, Thomasville, Vice-President; Dr. C. K. Wall, Thomasville, Secretary-Treasurer.

Walker County Medical Society has elected Dr. M. W. Spearman, Chickamauga, President; Dr. J. A. Shields, LaFayette, Vice-President; Dr. J. H. Hammond, LaFayette, Secretary-Treasurer.

Warren County Medical Society has elected Dr. A. W. Davis, Warrenton, President; Dr. F. L. Ware, Warrenton, Vice-President; Dr. R. C. McGohee, Warrenton, Secretary-Treasurer.

Wayne County Medical Society has elected Dr. J. Lawton Tyre, Screven, President; Dr. I. K. Ogden, Odum, Vice-President; Dr. M. N. Stow, Jesup, Secretary-Treasurer.

Worth County Medical Society has elected Dr. J. L. Tracy, Sylvester, President; Dr. H. S. McCoy, Doerun, Vice-President; Dr. W. C. Tipton, Sylvester, Secretary-Treasurer.

At a meeting of the County Health Officers Association in Atlanta recently, Dr. H. L. Akridge, Brunswick, was elected President; Dr. J. H. Hammond, LaFayette, Vice-President; Dr. V. H. Bassett, Savannah, Secretary.

The Woman's Auxiliary of the Spalding County

SUMMER CLINICS
EMORY UNIVERSITY SCHOOL OF MEDICINE

In the coming summer the Medical Faculty will again offer two weeks of clinics to graduates and undergraduates in Medicine. The time will be from Monday, July 9th, through Saturday, July 21st.

Clinics: Six hours daily—9-12 A.M. 1-4 P.M.

These clinics will cover all branches of medicine and surgery, the specialties being presented with reference to their general medical significance.

No fee will be charged.

For further information address

Russell H. Oppenheimer, M.D., Dean, 50 Armstrong St., Atlanta, Georgia.

Medical Society was organized on January 17. Mrs. Kenneth S. Hunt was elected President; Mrs. A. H. Frye, Vice-President; Mrs. H. W. Copeland, Secretary-Treasurer.

The King's Daughters' Hospital, Waycross, was practically destroyed by fire January 27 while the institution was filled to capacity. The patients were moved safely to nearby homes. Plans are being considered to raise funds and rebuild the Hospital.

Dr. Thomas J. Charlton, Savannah, was elected Chief of the Staff of the Georgia Infirmary, Savannah, at a recent meeting of the Board of Directors. He succeeds Dr. Craig Barrow who gave up the work to devote his whole time at the new Central of Georgia Railway Hospital.

Dr. A. E. Thayer, former Director of Laboratories at St. Luke's Hospital, Cleveland, Ohio, wil conduct the work of the Macon Hospital Laboratories.

Dr. J. H. Latimer, Waycross, has been elected Health Officer of Waycross.

The first address under the Abner Wellborn Calhoun Lectureship of the Medical Association of Georgia will be given May 9 by Dr. George E. deSchweinitz, of Philadelphia.

Dr. J. N. Carter and Dr. D. B. Edwards, Savannah, have been elected to the Board of Managers of the Savannah Hospital.

Deaths

Dr. Stephen Hanford Hankinson, Augusta, aged 50, died February 11 of cerebral hemorrhage and arteriosclerosis.

Dr. Emory Freeman Jones, Crumps Park, aged 53, died January 28 of heart disease.

Dr. Samuel S. Gulden, Quitman, aged 68, died February 7 of nephritis and cerebral hemorrhage.

KENTUCKY

Caldwell County Medical Society was reorganized January 24. Dr. F. S. Linton was elected President; Dr. W. P. Morse, Princeton, Vice-President; Dr. W. L. Cash, Princeton, Secretary-Treasurer.

Fayette County Medical Society has elected Dr. W. T. Briggs, Lexington, President; Dr. T. M. Marks, Lexington, Vice-President; Dr. E. S. Maxwell, Lexington, Secretary-Treasurer.

Franklin County Medical Society has elected Dr. C. E. Youmans, Frankfort, President; Dr. G. A. Budd, Frankfort, Vice-President; Dr. L. T. Minish, Frankfort, Secretary-Treasurer.

Hardin County Medical Society has elected Dr. J. S.

(Continued on page 34)

OFFICERS, SOUTHERN MEDICAL ASSOCIATION, 1927-1928

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First Vice-President—Dr. E. C. Ellett, Memphis, Tenn.

Second Vice-President—Dr. W. L. Dunn, Asheville, N. C.

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Board of Trustees (All are ex-Presidents)—Dr. Seale Harris, Chairman, Birmingham, Ala.; Dr. W. S. Leathers, Nashville, Tenn.; Dr. Chas. L. Minor, Asheville, N. C.; Dr. Stewart R. Roberts, Atlanta, Ga.; Dr. C. C. Bass, New Orleans, La.; Dr. J. Shelton Horsley, Richmond, Va.

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Section on Radiology—Dr. E. C. Samuel, Chairman, New Orleans, La.; Dr. John D. MacRae, Vice-Chairman, Asheville, N. C.; Dr. W. S. Lawrence, Secretary, Memphis, Tenn.

Section on Dermatology and Syphilology—Dr. Earl D. Crutchfield, Chairman, San Antonio, Tex.; Dr. C. Brooks Willmott, Vice-Chairman, Louisville, Ky.; Dr. Howard Hailey, Secretary, Atlanta, Ga.

Section on Surgery—Dr. Evarts A. Graham, Chairman, St. Louis, Mo.; Dr. Battle Malone, Vice-Chairman, Memphis, Tenn.; Dr. Charles A. Vance, Secretary, Lexington, Ky.

Section on Bone and Joint Surgery—Dr. W. B. Carrell, Chairman, Dallas, Tex.; Dr. J. S. Speed, Vice-Chairman, Memphis, Tenn.; Dr. Oscar L. Miller, Secretary, Gastonia, N. C.

Section on Gynecology—Dr. Wm. T. Black, Chairman, Memphis, Tenn.; Dr. Elbert Dunlap, Vice-Chairman, Dallas, Tex.; Dr. Thos. B. Sellers, Secretary, New Orleans, La.

Section on Obstetrics—Dr. Wm. T. McConnell, Chairman, Louisville, Ky.; Dr. J. R. McCord, Vice-Chairman, Atlanta, Ga.; Dr. J. L. Andrews, Secretary, Memphis, Tenn.

Section on Urology—Dr. Bransford Lewis, Chairman, St. Louis, Mo.; Dr. Montague L. Boyd, Vice-Chairman, Atlanta, Ga.; Dr. R. A. Hennessey, Secretary, Memphis, Tenn.

Southern States Association of Railway Surgeons.—(Auxiliary of the Southern Medical Association)—Dr. Archibald E. Chace, Chairman, Texarkana, Ark.; Dr. Frank H. Walke, Vice-President, Shreveport, La.; Dr. J. W. Palmer, Secretary, Ailey, Ga.

Section on Eye, Ear, Nose and Throat—Dr. Edward A. Looper, Chairman, Baltimore, Md.; Dr. Frederick E. Hasty, Secretary, Nashville, Tenn.

Section on Public Health—Dr. B. L. Arms, Chairman, Jacksonville, Fla.; Dr. Chas. O. Laughinghouse, Vice-Chairman, Raleigh, N. C.; Dr. P. E. Blackerby, Secretary, Louisville, Ky.

National Malaria Committee (Conference on Malaria)—(Meeting conjointly with Southern Medical Association)—Dr. L. O. Howard, Honorary Chairman, Washington, D. C.; Dr. Felix J. Underwood, Chairman, Jackson, Miss.; Dr. E. L. Bishop, Vice-Chairman, Nashville, Tenn.; Dr. L. L. Williams, Jr., Secretary, Richmond, Va.

Section on Medical Education—Dr. Stuart Graves, Chairman, Louisville, Ky.; Dr. J. H. Musser, Vice-Chairman, New Orleans, La.; Dr. Robert Wilson, Secretary, Charleston, S. C.

Southern Association of Anesthetists—(Meeting conjointly with Southern Medical Association)—Dr. C. E. Kidd, President, Paducah, Ky.; Dr. Wilmer Baker, First Vice-President, New Orleans, La.; Dr. A. C. Shamblin, Second Vice-President, Rome, Ga.; Dr. W. Hamilton Long, Secretary-Treasurer, Louisville, Ky.

Women Physicians of the Southern Medical Association—Dr. Annie L. Sawyer, Chairman, Atlanta, Ga.; Dr. Alma B. Richards, Vice-Chairman, Memphis, Tenn.; Dr. Mary B. Baughman, Secretary-Treasurer, Richmond, Va.

Woman's Auxiliary of the Southern Medical Association—Mrs. A. T. McCormack, President, Louisville, Ky.; Mrs. C. W. Garrison, President-Elect, Little Rock, Ark.; Mrs. O. M. Marchman, First Vice-President, Dallas, Tex.; Mrs. M. H. Bell, Second Vice-President, Vicksburg, Miss.; Mrs. J. N. Brawner, Recording Secretary, Atlanta, Ga.; Mrs. J. W. Sams, Corresponding Secretary, Crestwood, Ky.; Mrs. W. K. West, Treasurer, Oklahoma City, Okla.; Mrs. B. F. Turner, Parliamentarian, Memphis, Tenn.

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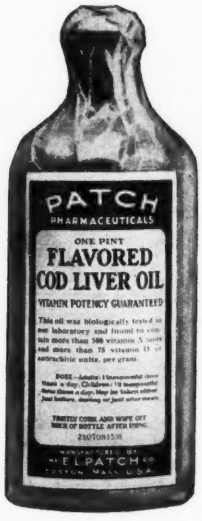
The least amount of cod liver oil required daily to promote a renewal of growth in albino rats that have ceased to grow and may show symptoms of malnutrition, such as xerophthalmia, on diets adequate except for vitamin A, is considered as one vitamin A unit. We guarantee more than 500 vitamin A units per gram.



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The antirachitic or vitamin D potency of this oil is determined by a modification of the method described by McCollum, Simmonds, Shipley and Park. The least amount of cod liver oil required daily during a period of eight days, to promote recalcification in the tibia of young albino rats suffering from experimental rickets is considered as one vitamin D unit. We guarantee more than 75 vitamin D units per gram. While the quantity and quality of available sunlight may or may not be adequate to meet the needs of growing children, here is a sure source of vitamin potency.

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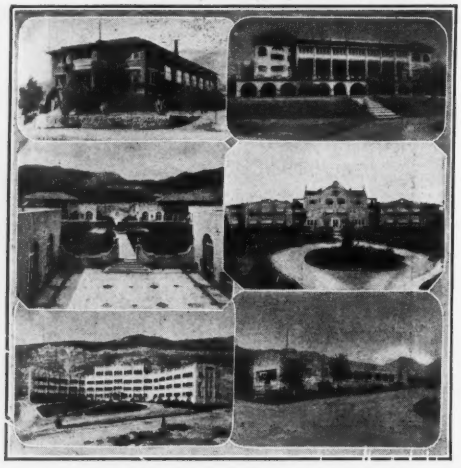

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Name.....

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(Continued from page 420)

Bean, President; Dr. C. W. Rogers, Vice-President; Dr. D. E. McClure, Secretary-Treasurer.

Perry County Medical Society has elected Dr. N. G. Riggins, Hazard, President; Dr. Dana Snyder, Hazard, Vice-President; Dr. J. M. Ray, Allais, Secretary-Treasurer.

Union County Medical Society has elected Dr. G. B. Carr, Sturgis, President; Dr. H. B. Stewart, Morganfield, Vice-President; Dr. David C. Donan, Morganfield, Secretary.

Because of the conditions of the roads, no joint meetings of the Adair, Green and Taylor Medical Society were held during the first three months of the year. An all day meeting is planned in June.

Dr. Clarence H. Harris, Health Officer of Louisville, has been appointed Collaborating Epidemiologist for Kentucky in the U. S. Public Health Service.

Dr. James M. Salmon, Ashland, was elected President of the Central Tri-State Medical Society.

Dr. Luther Bach has resigned as Director of the Breathitt County Health Unit.

Dr. Samuel B. Marks succeeds Dr. Waller O. Bullock as President of the Board of Health of Lexington.

Deaths

Dr. German Baxter Miller, Lexington, aged 75, died January 20 at a sanitarium in Louisville.

Dr. William E. Woodrow, Monticello, aged 60, died in January at Louisville of heart disease.

Dr. Harry R. Simmons, Corinth, aged 61, died February 10 of arteriosclerosis and softening of the brain.

Dr. Charles J. Cook, Belmont, aged 84, died November 5 of senility.

Dr. Alvin M. Wallingford, Flemingsburg, aged 86, died February 15, of cerebral hemorrhage.

(Continued on page 36)

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(Continued from page 34)

LOUISIANA

The Tri-State Medical Society of Louisiana-Arkansas-Texas met in Shreveport, January 18-19. Dr. Guy A. Caldwell, Shreveport, was elected President; Dr. S. C. Barrow, Shreveport, Dr. M. L. Norwood, Locksburg, Arkansas, and Dr. W. G. Hartt, Marshall Tex., Vice-Presidents; Dr. Frank H. Walke, Shreveport, reelected Secretary-Treasurer. The next meeting will be held in Texarkana, Arkansas-Texas, in 1929.

The Twelfth Annual Clinical Session of the American College of Physicians was held in New Orleans March 5-9. Dr. J. H. Musser, of New Orleans, was elected President-Elect.

LaFourche Parish Medical Society has elected Dr. Albert Meyer, Thibodaux, President; Dr. J. Dunshie, Rita, Vice-President; Dr. Philip Dansereau, Thibodaux, Secretary-Treasurer.

Terrebonne Parish Medical Society has elected Dr. R. W. Collins, Houma, President; Dr. T. I. St. Martin, Houma, Vice-President; Dr. P. E. Parker, Houma, Secretary-Treasurer.

Pointe Coupe Medical Society has elected Dr. R. M. G. Carruth, New Roads, President; Dr. F. F. Rougon, Oscar, Secretary.

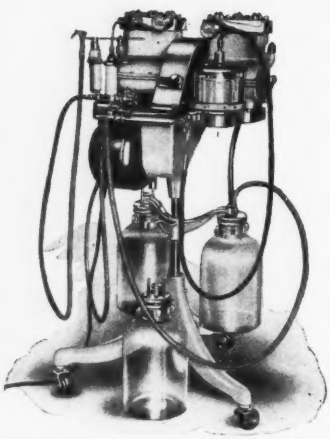
To assist in providing safe milk in Louisiana, the State Board of Health and the New Orleans Board of Health sponsored a dairy school of instruction, February 16-20. Special features included visits to the Wisconsin Dairy Special Demonstration Train, to pasteurizing plants, abattoirs and to grade A dairies about New Orleans.

Base Hospital No. 24, the Tulane World War Medical Unit, held its third reunion at New Orleans, February 2, which was approximately the tenth anniversary of its departure from Fort Oglethorpe, Georgia, for France.

At the annual meeting of the Clinical Staff of the Presbyterian Hospital, New Orleans, Dr. John W. Lindner was reelected President; Dr. Ada Kiblinger,

(Continued on page 38)

The McKesson Surgical Pump P-500



This apparatus is designed for any purposes to which air pressure, ranging from 0 to 40 pounds, or vacuum from 0 to 20 inches mercury, may be employed in the operating room. Among some of the more important uses are the administration of ether vapor for anesthesia; the evacuation of blood from the throat in tonsillectomy; the operation of atomizers, nebulizers, powder blowers; irrigation and evacuation of the gall bladder, urinary bladder; evacuation of pus, blood or other fluids from the chest, abdomen, cranium; the removal of gas from the bowel, particularly during operations for obstructions, and instillation of salt solutions through the same needle or trocar. It is particularly useful for intravenous saline through small needles in shock cases.

We have a complete line of McKesson Pumps. Write for information.

TOLEDO TECHNICAL APPLIANCE COMPANY,
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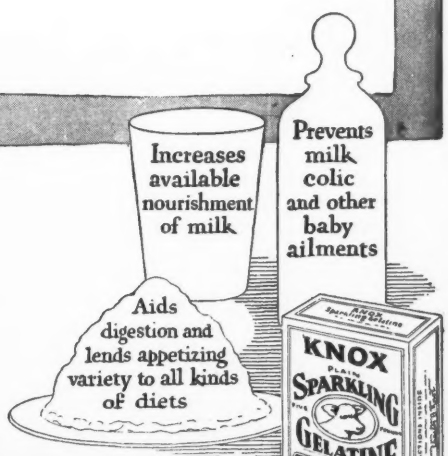
"*Diet* in the treatment of *Diabetes*" . . . let us send you this booklet - and valuable recipes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Prevents milk colic and other baby ailments
Aids digestion and lends appetizing variety to all kinds of diets
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GELATINE
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WAYS of improving the diabetic diet are always important. There are two ways to improve it—make it more appetizing—make it more effective. Monotony in the diabetic diet is its chief enemy!

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From raw material to finished product Knox Sparkling Gelatine is constantly under chemical and bacteriological control, and is never touched by hand while in process of manufacture.

For accurate digitalis dosage by mouth

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(Continued from page 36)

Vice-President; Dr. Donovan C. Browne reelected Secretary-Treasurer.

In recognition of his distinguished service to the British government in the field of tropical medicine, the honor of knighthood has been conferred on Dr. Aldo Castellani, Professor and Director of the Department of Tropical Medicine, Tulane University of Louisiana School of Medicine, New Orleans.

Deaths

Dr. Julia Stoddard Wood, Jennings, aged 67, died January 25 of nephritis.

MARYLAND

The Sheppard and Enoch Pratt Hospital, Towson, which is a psychiatric institution, has completed plans to construct a seventy-five bed reception hospital and diagnostic clinic. This will give the Hospital a total capacity of about 220 beds. Moses Sheppard who founded the Hospital seventy-five years ago, left $600,000 for its support. Enoch Pratt later gave $1,500,000.

The Emergency Hospital, Annapolis, was recently practically destroyed by fire.

The U. S. Public Health Service has loaned Dr. Paul Preble to the Maryland State Department of Health to take charge of the Bureau of Vital Statistics, pending the selection of a physician to that position. He will continue his work at the Johns Hopkins School of Hygiene and Public Health Baltimore, while doing health work.

Dr. Howard A. Kelly, who celebrated his seventieth birthday February 20, wil take part in a geologic expedition to Utah in the spring.

Dr. John R. Devereaux, Chevy Chase, was recently appointed Medical Director for the Catholic Near East Welfare Association. He will go to Europe to make a survey of public health conditions in the Near East, and will recommend such relief measures as the Association may be able to offer.

(Continued on page 40)

Ultra Violet Technique Simplified

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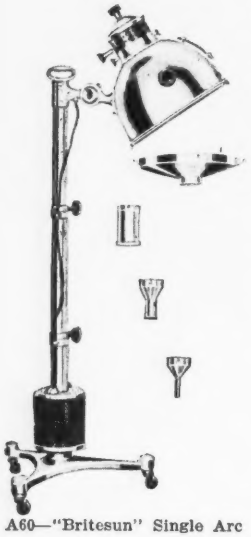

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The psychology of the office and consulting room is no mean factor in the conduct of a successful practice, and that psychology is largely supplied by the proper office equipment.

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Besides being therapeutically efficient in design and producing a large range of Ultra Violet energy, it is like all of the BRITESUN lamps, exceedingly handsome and makes a very attractive as well as useful addition to your office equipment.

Authorized distributors in all leading cities

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for Diagnosis and Treatment

AN ARLCO-POLLEN COLLECTOR

TREE HAYFEVER can be accurately identified by skin test with the pollens of locally prevalent trees and thereby differentiated from the "common colds" of early spring.

GRASS HAYFEVER begins about the time *tree hayfever* ends, *viz.* May 15th, and need not be confused with the earlier appearing and sometimes overlapping tree hayfever.

WEED HAYFEVER—August to frost—is unrelated to the previously occurring *grass hayfever* and is occasioned, according to the locality, by such late pollinating plants as the Ragweeds—Russian Thistle—Western Water Hemp—Carelessweed—or Sage Brush.

LIST of pollens for any section—any season—with commentary circular discussing the treatment of hayfever by *preseasonal* or *coseasonal* method, with respective schedules of dosage—sent on request.

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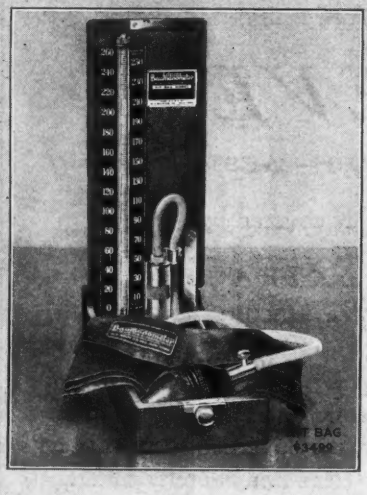

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STANDARD FOR BLOODPRESSURE

W. A. Baum Co. Inc.-*Originators*
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100 FIFTH AVENUE NEW YORK

(Continued from page 38)

Dr. Lewis R. Thompson, U. S. Public Health Service, delivered a De Lamar lecture on "Industrial Pneumonoconioses" at the School of Hygiene and Public Health, Johns Hopkins University, Baltimore, February 7.

Dr. S. Tumminello and Miss Anna E. Dimarco, both of Baltimore, were married December 26.

Dr. Lawrence Burton Sheldon, Baltimore, and Miss Lois Madale Iverson Schier, Evanston, Illinois, were married February 18.

Deaths

Dr. Roscoe Conkling Metzel, Baltimore, aged 48, died February 29 of carcinoma of the kidney with metastasis.

Dr. Edward Everett Mackenzie, Baltimore, aged 70, died February 11 of angina pectoris.

Dr. John Winfield Harrison, Middle River, aged 58, died suddenly January 25 of cerebral hemorrhage.

MISSISSIPPI

At the forty-fourth annual convention of the Tri-States Medical Association of Mississippi, Arkansas and Tennessee, which met in Memphis, February 29-March 1-2, the following officers were elected. Dr. V. B. Philpot, Houston, President; Dr. A. G. Payne, Greenville, Dr. Julius A. Bogart, Forrest, City, Arkansas, and Dr. George W. Penn, Humboldt, Tennessee, Vice-Presidents; Dr. A. F. Cooper, Memphis, was re-elected Secretary-General.

The Northeast Mississippi Medical Society, composed of thirteen counties and about two hundred members, held its first quarterly session at Booneville, March 20. Dr. H. L. Scales, Starkville, is President, and Dr. James M. Acker, Aberdeen, Secretary.

Upon invitation of the State Health Officer, Dr. Felix J. Underwood, the Louisiana State Board of Health sent its health cars to McComb and Brookhaven February 14-15. Dr. Oscar Dowling, Louisiana State Health Officer, was in personal charge of the cars.

(Continued on page 42)

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Contents of Kit:* One 2-oz. bottle of Duo Liquid Adhesive, one dozen assorted dressings, two dozen swabs, one package of lint.

Duo Liquid Adhesive is ideally suited for dressing all sorts of minor wounds, especially of the face and scalp, where a small neat dressing is particularly desirable.

Dressings made with Duo Liquid Adhesive set quickly and securely, yet can be peeled off with little or no discomfort to the patient. It leaves no residue.

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--assures accuracy

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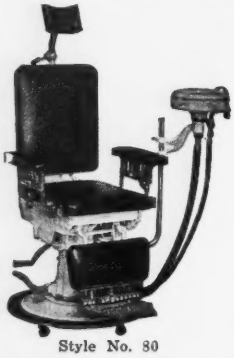

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(Continued from page 40)

The Field Hospital, Centerville, was opened February 28. The institution is splendidly built and is equipped with a capacity sufficient to take care of thirty-five patients. Dr. Felix J. Underwood, State Health Officer, made an address at the opening.

The Pearl River County Hospital, Poplarville, was recently completely destroyed by a boiler explosion.

Dr. H. P. Rankin has been elected Director of the Washington County Health Department.

MISSOURI

Audrain County Medical Society has elected Dr. Fred Griffin, Mexico, President, Dr. J. G. Moore, Mexico, Vice-President; Dr. H. C. Brashear, Mexico, Secretary-Treasurer.

Green County Medical Society has elected Dr. H. A. Lowe, Springfield, President; Dr. A. D. Knabb, Springfield, Vice-President; Dr. Robert Blynn, Springfield, Secretary; Dr. W. E. Handley, Springfield, Treasurer.

St. Charles County Medical Society has elected Dr. T. L. Hardin, St. Charles, President; Dr. B. G. Gossow, St. Charles, Vice-President; Dr. L. E. Belding, St. Charles, Secretary-Treasurer.

The Southeast Missouri Hospital, Cape Girardeau, was dedicated January 8. The building cost $150,000.

The Brandon Hospital, Popular Bluff, constructed at a cost of approximately $100,000, was dedicated and opened January 22. It is a forty bed hospital.

The Eugene Field Foundation for the Relief of Crippled Children was organized in St. Louis recently. The immediate object was to raise $100,000 by April 1 to meet the emergency caused by the exhaustion of the state appropriation of $35,000 for the care of crippled children. The Foundation will provide hospital care and education for indigent crippled children, provide appliances and maintain hospital wards.

Plans for the addition of a $110,000 nurses' building and a $15,000 school building to the Shriners' Hospital for Crippled Children, St. Louis, were submitted to the

(Continued on page 44)

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"According to our experience and to that of some others, irradiated dried milk, when fed in the customary amounts, is as potent an antirachitic as cod liver oil." Hess-Weinstock, Nov. 1927, Am. J. Diseases of Children.

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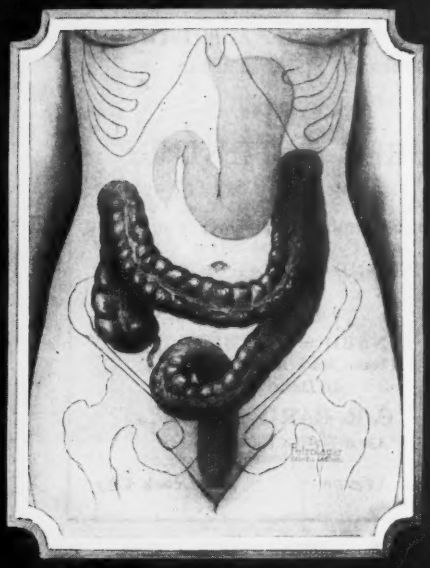

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Separate enlargements of this engraving and "Habit Time" mailed free on request.

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In any displacement of the colon where constipation is encountered, Petrolagar has a distinct and valuable use because it overcomes bowel stasis without irritation.

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(Continued from page 42)

National Governing Board of Shriners' Hospitals, which held its quarterly meeting in St. Louis, February 10-13. The nurses' home will be a two-story brick structure equipped with swimming pool and solarium. The Shriners operate ten permanent and five mobile hospitals for crippled chilren in the United States and Canada.

Edward Mallinckrodt, St. Louis, chemical manufacturer, who died February 1 at the age of 83, left an estate estimated at about two million dollars to be used for science, religion, charity and education. In his will, he mentions Washington University and St. Luke's Hospital, stipulating that at the discretion of his son the estate may be divided equally or unequally between these institutions, or that any or all of it may be diverted to other philanthropies, as the son elects. The remainder of the total, if the estate remains untouched during his son's life, is to be divided equally between the University and the Hospital. Mr. Mallinckrodt was a member of the Board of Trustees of Washington University. His son has now been elected to this position. During his life, Mr. Mallincrodt gave about $1,000,000 to the Medical School of the University; about $500,000 to Harvard University, and several thousand to St. Luke's Hospital, St. Louis.

The sons of Mr. Seeley Mudd, of California, have given $25,000 in memory of their father, to be used to establish a department for the treatment of cancer by deep roentgen-ray therapy at St. Luke's Hospital, St. Louis.

Dr. Louis J. Wolfort, St. Louis, has been appointed to the Missouri Nurse Examiners Board.

Dr. Dean D. Lewis, Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore, Maryland, delivered the Hodgen Lecture before the St. Louis Medical Society on "Reconstruction Surgery", March 26.

Dr. Ferdinand C. Helwig has been appointed Full-Time Pathologist to St. Luke's Hospital, Kansas City.

Dr. Edward H. Skinner, Kansas City, was recently

(Continued on page 46)

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Only Fresh Milk from tuberculin tested cows and from dairy farms that have fulfilled the sanitary requirements of the City of Cleveland Board of Health, is used as a basis for the production of *S. M. A.* In addition, the milk must meet our own rigid standard of quality.

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Manhattan Eye Salve Company

Louisville, Kentucky

(Continued from page 44)

presented with a desk chair by the Southwest-Kansas City Clinical Society, in appreciation of his work for the Society, which he is said to have organized.

Deaths

Dr. Wesley Bibb Kerr, Dudley, aged 66, died January 30 of heart disease.

Dr. Paul Yoer Tupper, St. Louis, aged 69, died suddenly February 1 of heart disease.

Dr. Messer Highfill, Marshfield, aged 69, died January 28 of cerebral hemorrhage.

Dr. William B. McCoy, Coffey, aged 71, died January 16 at Laclede of chronic intestinal nephritis.

Dr. Anthony J. Gannon, Kansas City, aged 59, died January 31 of nephritis.

Dr. Robert W. Rea, Plattsburg, aged 67, died January 23 at the Missouri Methodist Hospital, St. Joseph of pneumonia.

Dr. Adonijah William Parrish, Kirksville, aged 75, died February 2 of arteriosclerosis.

NORTH CAROLINA

The Tri-State Medical Association of the Carolinas and Virginia held its thirtieth annual meeting at Virginia Beach, Virginia, in February. Dr. James K. Hall, Richmond, was elected President; Dr. Oren Moore, Charlotte, Dr. DeWitt Kluttz, Greenville, South Carolina, and Dr. R. Finley Gayle, Richmond, Vice-Presidents; Dr. James M. Northington, Charlotte, re-elected secretary-Treasurer.

The Kinston Clinic has been opened in the New Medical Arts Building, Kinston. The staff is the same as the staff of the Memorial General Hospital which opened about two and a half years ago, except the consulting staff of the Hospital which is composed of the following: Dr. G. Paul LaRoque, Dr. Manfred Call, Dr. Fred Hodges, Richmond, Va.; Dr. J. Buren Sidbury, Wilmington, and Dr. T. B. Henderson, Goldsboro.

(Continued on page 48)

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(Continued from page 46)

Construction has been started on a new fire-resistant building for the Babies Hospital, Wrightsville Sound. It will have a capacity of forty beds and will be completed soon.

St. Leo's Hospital, Greensboro, has been improved. An additional operating room has been completed, increased laboratory facilities added, and repair work has been done throughout the hospital

Dr. Andrew J. Crowell, Charlotte, has been elected President of the State Board of Health, succeeding the late Dr. J. Howell Way.

Deaths

Dr. John I. Fowlkes, Hamlet, aged 54, died January 2 of arteriosclerosis.

Dr. James F. Pickens, Asheville, died at Fort Myers, Florida, February 8.

Dr. H. F. Glenn, Gastonia, died February 27 of pneumonia.

OKLAHOMA

Kiowa County Medical Society has elected Dr. J. A. Land, Hobart, President; Dr. E. P. Miles, Hobart, Vice-President; Dr. J. H. Moore, Hobart, Secretary-Treasurer.

The two upper floors of the St. John's Hospital, Tulsa, are to be completed and put in use immediately. They will contain the operating, sterilizing and laboratory rooms, diet kitchen and physicians' dressing rooms, as well as additional patient beds. The first two floors were completed two years ago.

The corner stone of the State Hospital for Crippled Children, under construction near the University Hospital, Oklahoma City, was laid by the Masonic Grand Lodge, February 13. The hospital will cost about $300,000.

Congress has appropriated $50,000 to be used for the Indian Hospital, Claremore.

Dr. Pinnell, Wormington and Dr. DeArman, Miami, have become the owners of the Hotel Kenoyer, Miami.

Dr. and Mrs. W. H. Livermore, Chickasha, are cruising in the Carribean Sea.

Dr. Peter Coje White, Tulsa, has been selected to represent the Optimist Club on the Citizens Committee which will receive and study the report on the child welfare survey which is now in progress in Tulsa.

Dr. L. A. Mitchell, Stillwater, physician to the Agricultural and Mechanical College, was recently appointed County Health Officer of Payne County.

Deaths

Dr. John Edgar Bercaw, Okmulgee, aged 47, died February 13 of carcinoma of the thyroid.

Dr. Levy S. Munsell, Beaver, aged 86, died February 5.

Dr. James G. Harris, Muskogee, aged 39, died December 31 after a short illness from uremia.

SOUTH CAROLINA

The Tri-States Medical Association of the Carolinas and Virginia held its thirtieth annual meeting at Virginia Beach, Virginia, in February. Dr. James K. Hall, Richmond, was elected President; Dr. Oren Moore, Charlotte, North Carolina, Dr. DeWitt Kluttz, Greenville, and Dr. R. Finley Gayle, Richmond, Vice-Presidents; Dr. James M. Northington, Charlotte, North Carolina, re-elected Secretary-Treasurer.

Clarendon County Medical Society has elected Dr. W. H. Carrigan, Summerton, President; Dr. C. B. Geiger, Manning, Vice-President; Dr. L. C. Stukes, Summerton, Secretary-Treasurer.

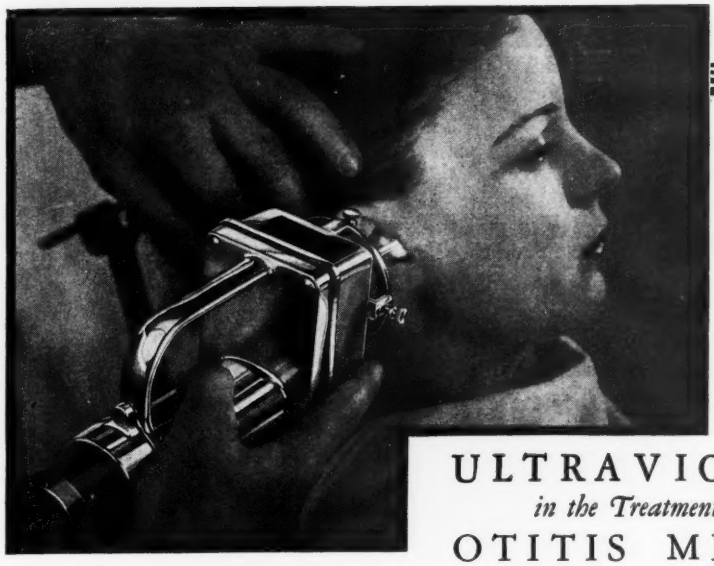
Darlington County Medical Society has elected Dr. McIver Wilcox, President; Dr. E. H. King, and Dr. O. A. Alexander, vice-Presidents; Dr. Julian T. Coggeshall, Secretary; Dr. J. W. Willcox, Treasurer.

More than a hundred persons attended the annual banquet of the Marlboro County Medical Society January 12 at Bennettsville.

Deaths

Dr. Ernest Cornish Baynard, Charleston, died recently.

(Continued on page 50)



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References: Dr. J. O. Denman, Ear, Nose and Throat Monthly, March 1923 and January 1926. Dr. H. Gerstenberger, Amer. J. of Diseases of Children, Oct. 1922, p. 320. Dr. J. Zahorsky, Mo. State Med. Jour., Feb. 1925. Drs. A. R. Hollender and Maurice H. Cottle, Amer. J. of Phys. Therapy, Apr. 1925, and Eye, Ear, Nose and Throat Monthly, Feb. 1925.

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NEW ORLEANS, LA.

(Continued from page 48)

TENNESSEE

The forty-fourth annual meting of the Tri-States Medical Association, Mississippi, Arkansas and Tennessee, was held in Memphis, February 29-March 1-2. The following officers were elected: Dr. V. B. Philpot, Houston, Miss., President; Drs. A. G. Payne, Greenville, Miss., Julius A. Bogart, Forrest City, and George W. Penn, Humboldt, Ark., Vice-Presidents; Dr. A. F. Cooper, Memphis, was re-elected Secretary-General.

Franklin County Medical Society has elected Dr. M. M. Huling, Winchester, President; Dr. W. B. Sutton, Huntland, Vice-President; Dr. John P. Grisard, Winchester, Secretary.

Madison County Medical Society has elected Dr. W. T. Fite, Jackson, President; Dr. J. R. Thompson, Jr., Jackson, Vice-President; Dr. B. C. Arnold, Jackson, Secretary.

Robertson County Medical Society has elected Dr. J. R. Connell, Adams, President; Dr. J. S. Freeman, Springfield, Vice-President; Dr. W. F. Fyke, Springfield, Secretary-Treasurer.

Warren County Medical Society has elected Dr. E. L. Moneyham, Rock Island, President; Dr. John S. Harris, McMinnville, Secretary-Treasurer.

A joint city and county bond issue of $250,000 has been authorized for the erection of a hospital for children, Chattanooga. It will be for both white and colored children. According to the present plans, the Hospital will care for all cases, including contagious diseases.

Dr. Ashley Ogle is the new Medical Director of the Goetz Sanitarium, Knoxville.

The East Tennessee Medical Association will meet at Rogersville, May 10-11.

Dr. Theodore W. Davis and Miss Edna Earl Tharpe, both of Nashville, were married February 15.

Deaths

Dr. John McQuaid Thompson, Nashville, aged 65, died October 29 at the Protestant Hospital of endarteritis obliterans and myocarditis.

Dr. Charles Emory Pierce, Nashville, aged 52, died January 31 of complications following influenza.

Dr. Alexander P. Waterfield, Union City, aged 93, died February 7 of heart disease.

Dr. Kyle Patrick Elam, Persia, aged 63, died January 29 of tuberculosis.

TEXAS

Bowie County Medical Society has elected Dr. T. E. Fuller, Texarkana, President; Dr. W. P. Gardner, Texarkana, and Dr. W. E. Womack, Red Water, Vice-Presidents; Dr. W. Decker Smith, Texarkana, Secretary.

Hardeman-Cottle Counties Medical Society has elected Dr. T. F. Frizell, Quanah, President; Dr. A. C. Rogers, Vernon, Vice-President; Dr. Evelyn G. Powers, Chillicothe, Secretary.

Parker County Medical Society has elected Dr. Charles MacNelly, Weatherford, President; Dr. L. C. Barrett, Garner, Vice-President; Dr. Alexander S. Garrett, Weatherford, Secretary.

(Continued on page 52)

Important Announcement

Prof. Georges Portmann, Association of the University of Bordeaux, France, begs to announce a five weeks' Post-Graduate Course of Ear, Nose and Throat Surgery to begin August 6th, 1928. This Course is complete in every detail.

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(Continued from page 50)

The Tri-State Medical Society of Louisiana-Arkansas-Texas met in Shreveport, Louisiana, January 18-19. Dr. Guy A. Caldwell, Shreveport, Louisiana, was elected President; Dr. S. C. Barrow, Shreveport, Louisiana, Dr. M. L. Norwood, Locksburg, Arkansas, and Dr. W. G. Hartt, Marshall, Vice-Presidents; Dr. Frank H. Walke, Shreveport, Louisiana, re-elected Secretary-Treasurer. The next meeting will be held in Texarkana in 1929.

Dr. B. F. Shaw, Henderson, is planning to build a twenty room sanitarium.

The new Methodist Hospital, Dallas, has been completed. It was built at a cost of $800,000 and contains out-patient department, children's floor, maternity floor and complete equipment for the proper functioning of a general hospital.

The Meckel Building, Fredericksburg, is being remodeled and ten or more rooms added, and equipped for a sanitarium. The estimated cost is about $50,000.

Oak Cliff will soon have a new eight story Medical-Dental Building.

The contract for the construction of a twelve story Medical Arts Building at Waco has been let. The building will cost approximately $400,000.

The Medical and Surgical Clinic Building, now under construction at Beaumont, will cost approximately $160,000. It will have a seventy-bed capacity. The directors are Dr. D. A. Mann, Dr. J. N. Gardner, Dr. H. B. Pedigo and Dr. H. E. Alexander.

The new Knox County Hospital has recently been opened at Knox City. It has a capacity of thirty-five beds and was erected at a cost of $60,000.

Fire completely destroyed the Waddell Building at McKinney, February 15. The upper story contained the offices of the following physicians: Dr. J. W. Largent, Dr. J. E. Hunter, Dr. D. E. Bridgefarmer, Dr. W. R. Mathers and Dr. R. L. Davis. The loss is estimated as about $75,000.

Dr. Henry P. Ledford and Miss Myrtle Hirschi, both of Wichita Falls, were married March 6.

(Continued on page 54)

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(Continued from page 52)

Deaths

Dr. Edmund R. Knolle, Brenham, aged 59, died January 23 of nephritis.

Dr. Kinch Collins Knolle, Brenham, aged 42, died February 18 of angina pectoris.

Dr. Elijah Thomas Lawler, Tyler, aged 77, died January 10.

Dr. DeWitt Talmadge Byrom, El Paso, aged 31, died November 4, of tuberculosis.

Dr. Joseph Bird Fitzpatrick, Killeen, aged 67, died December 19 of cerebral hemorrhage.

Dr. John Bragg Smoot, Dallas, aged 59, died February 2 of coronary disease and arteriosclerosis.

Dr. Marcus Miller Carr, Dallas, aged 39, died February 20 in a hospital in St. Louis, Missouri, of carcinoma.

Dr. Herman Ramming, Borger, aged 40, died December 28 at Amarillo of pneumonia.

Dr. Bruns Pitts Holland, Beaumont, aged 49, died December 31 of pneumonia.

VIRGINIA

The Virginia Tuberculosis Association held its nineteenth annual meeting in Richmond February 24. The following officers were elected: Dr. William F. Drewry, Petersburg, President; Dr. H. A. Latane, Alexdria, and Mrs. William Gatewood, Newport News, Vice-Presidents; Mr. George Call, Richmond, Treasurer; Dr. Roy K. Flannagan, Richmond, Secretary of the Board of Directors.

The Tri-State Medical Association of the Carolinas and Virginia held its thirtieth annual meeting at Virginia Beach in February. Dr. James K. Hall, Richmond, was elected President; Dr. Oren Moore, Charlotte, North Carolina, Dr. DeWitt Kluttz, Greenville, South Carolina, and Dr. R. Finley Gayle, Richmond, Vice-Presidents; Dr. James M. Northington, Charlotte, North Carolina, re-elected Secretary-Treasurer.

Wise County Medical Society has elected Dr. B. C.

(Continued on page 56)

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(Continued from page 54)

Henson, Roda, President; Dr. G. B. Setzler, Norton, Vice-President; Dr. W. R. Culbertson, Norton, Secretary.

A tall clock with chimes has been presented to the Fauquier Hospital at Warrenton, as a memorial to the late Dr. Howard Fletcher. It has been placed in the hall of the Hospital and was given by Dr. Fletcher's friends in the Medical Society of Northern Virginia, Maryland and the District of Columbia, of which Dr. Fletcher was a president. Dr. Fletcher was interested in the founding of the Hospital and died suddenly the day before its formal opening.

Dr. A. M. Showalter, Christianburg, has been elected Grand Junior Warden of the Grand Lodge A. F. & A. M. of Virginia.

Dr. Walter B. Martin, Norfolk, has been appointed a member of the Executive Council of the Medical Society of Virginia from the Second Congressional District. He fills the vacancy caused by the death of Dr. Israel Brown.

Dr. Joseph H. Hiden, Pungoteague, was awarded the first prize offered through Southern Medicine and Surgery for the best paper on "How the Family Doctor Can Increase His Usefulness and His Income." Forty-two essays were submitted. The contest was open to any reputable physician in Virginia or the Carolinas.

Dr. R. D. Garcin, Richmond, has been re-elected one of the directors of the Bank of Commerce and Trusts of Richmond.

Dr. Edwin R. Mickle, Phoebus, has moved to Williamsburg, where he is an assistant physician at the Eastern State Hospital.

Dr. Frank McCutchan, connected with the staff of the Gill Memorial Hospital, Roanoke, has moved to Salisbury, North Carolina.

(Continued on page 58)

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(Continued from page 56)

Deaths

Dr. Robert Carter Randolph, Boyce, aged 58, died February 20.

Dr. Frank Waring Lewis, Morattico, aged 71, died February 14 at the home of his son, Dr. F. W. Lewis, Jr., Richmond, at which place he was visiting.

Dr. Burleigh C. Kellam, Norfolk, aged 65, died February 4 of acute dilatation of the heart.

Dr. Israel Brown, Norfolk, aged 54, died February 10 at Charlottesville of heart disease.

WEST VIRGINIA

The new West Virginia Summer Camp for Boys has been established five miles from Webster Springs, occupying 25 acres of land along the Gauley River. It is incorporated under the name of the Gauley River Camp School Association. Dr. D. P. Kessler is one of the organizers.

Dr. G. W. Luckey has resumed his duties as Director of the Full-Time Health Unit of Boone County. He succeeds Dr. W. H. Enneis who resigned to accept the position of City Health Officer for Knoxville, Tennessee.

Dr. Harry B. Neagle is the new Health Officer of Lewis County with headquarters at Weston. He was previously engaged in public health work in Michigan and Georgia.

Dr. W. C. Camp, Spencer, succeeds Dr. Frank Makepeace as Health Officer for Roane County.

Dr. Thomas M. Winn has become associated with the staff of the McClung Hospital, Millboro.

Mr. J. Stanley Turk, Wheeling, succeeds Dr. H. F. Spillers as Superintendent of the Ohio Valley General Hospital, Wheeling.

Deaths

Dr. Alfred N. Frame, Parkersburg, aged 75, died January 4 of angina pectoris.

Dr. James Whann McSherry, Martinsburg, aged 95, the oldest living member of the State Medical Association and the oldest living ex-president of the Association, died February 28.

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